

Workstream:

Business Unit Assessment




Organizational Alignment Workstream

Update: Business Cases and White Paper

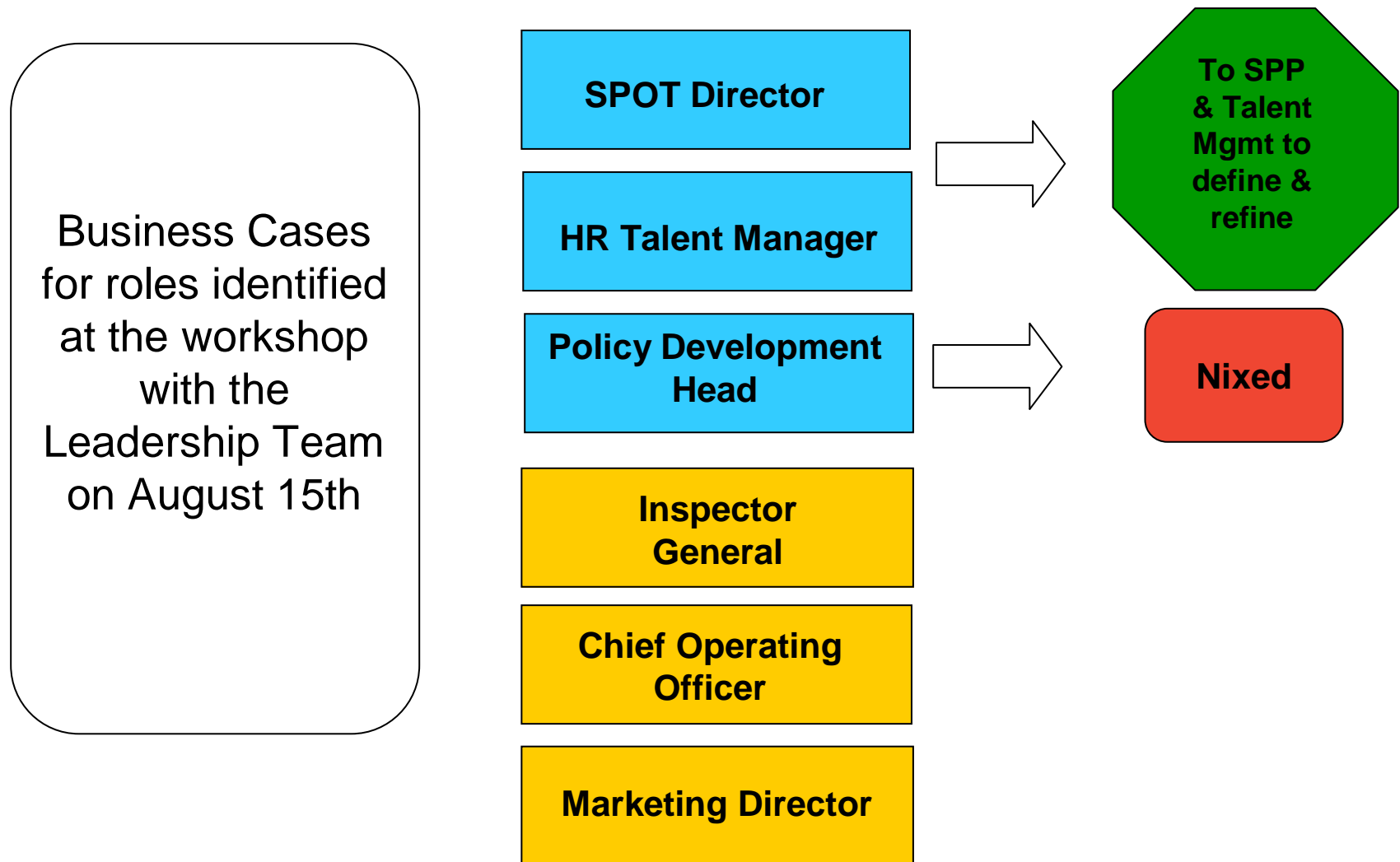


Leadership Team
October 31, 2007

Organizational Alignment

	Tasks	Status
	<ul style="list-style-type: none">• Create business cases for key roles within DOT<ul style="list-style-type: none">– COO– Inspector General– Marketing Director– SPOT Director– Talent Manager– Policy Development Head• Create “White Papers” to evaluate relationships with external organizations.	<ul style="list-style-type: none">• Completed - 3 Business Cases & 1 White Paper provided in pre-read materials on October 25, 2007.
	<ul style="list-style-type: none">• Structural exercise<ul style="list-style-type: none">– investigation of various ways of modifying the NCDOT’s structure to support its mission and goals.• Workshop conducted October 8, 2007.	<ul style="list-style-type: none">• Conferred with McKinsey expert• Researching best management practices.
	<ul style="list-style-type: none">• “Bottom up” approach<ul style="list-style-type: none">– missions, end products, and activities, (MEA) concept .	<ul style="list-style-type: none">• In process design. Two pilots completed to date.

Strategic Organization Design: Business Cases for Key Roles



Strategic Organization Design: Business Cases for Key Roles



Inspector
General

Job Overview: To ensure that NCDOT programs and operations comply with applicable laws, regulations, policies, and standards, and achieve departmental goals and objectives in an efficient and cost-effective manner. To establish the role of Information Systems Auditor.

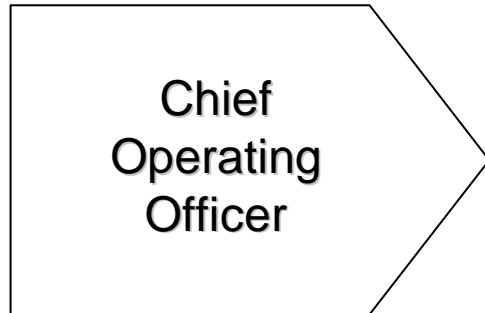
Justification for addition: Results of the State Auditor's Report dated 9/2006. Five significant issues identified and recommendation of another key role.

Some of the major responsibilities:

- Provide independent objective reviews & evaluations.
- Detect and prevent fraud, waste, & abuse.
- Establish procedures and practices that ensure safeguarding of assets.
- Comply with industry standards for auditing.

What will it look like: Combines external and internal auditing functions within one unit. Reports directly to the Secretary.

Strategic Organization Design: Business Cases for Key Roles



Job Overview: To oversee the day-to-day operations of the department to ensure optimal efficiency, effectiveness, and accountability.

Justification for addition: Role within Executive Management to lead change to performance-based culture, drive core business processes, and handle day-to-day operations.

Some of the major responsibilities:

- Head operational plan development and implementation to execute organizational strategy.
- Oversee PPSI delivery process.
- Imbue culture of operational excellence, efficiency, and project delivery within organization through leadership, performance-based management and accountability.

What will it look like: Reports directly to the secretary. Exempt position, but not politically appointed.

Strategic Organization Design: Business Cases for Key Roles



Marketing
Director

Job Overview: To develop and implement a market strategy that positively shapes the department's public image.

Justification for addition: Need for proactive posture in handling media and shaping of department's image.

Some of the major responsibilities:

- Identify and pursue strategic opportunities to positively highlight the department's image.
- Publicize departmental successes in the PPSI delivery processes.
- Manage creation, publication, and distribution of marketing, educational, and promotional items and literature.

What will it look like: Could be imbedded within PIO, a new position with staff, or KSAs contracted through outside marketing group.

Strategic Organization Design: White Paper - NCRR, NCSPA, & NCDOT

Modify linkages to North Carolina
Railroad & North Carolina
State Ports Authority

For our relationship with NCRR, changes are necessary to minimize delays in obtaining approval for rights-of-way for mutually beneficial projects and develop statewide logistics plan.

Several recommendations to modify NCRR linkages: (1) mandatory gubernatorial appointment of NCDOT secretary to NCRR board, (2) initiation of master planning work sessions, and (3) introduction of legislation to define NCRR roles, responsibilities and authority.

NCSPA plans for the construction of an international port, a multi-modal transportation network.

Recommendation to modify linkages with NCSPA is to continue dialogue as the foundation for collaborative and cooperative long-term planning.

QUESTIONS?

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRANSFORMATION MANAGEMENT TEAM

BUSINESS UNIT EFFICIENCIES WORKSTREAM REPORT

SURVEY ANALYSIS & RECOMMENDATIONS
OCTOBER, 2008

Table of Contents	2
ISSUE TO BE REVIEWED (HYPOTHESIS)	3
EXECUTIVE SUMMARY	3
RESEARCH AND FINDINGS.....	3
RECOMMENDATIONS	7
<i>Four Action Strategies for Efficiency Improvement</i>	7
<i>Deep Dives</i>	8
<i>Internal Efficiencies</i>	9
<i>Procedural Changes</i>	13
<i>Training</i>	14
APPENDICIES.....	16
ISSUE TO BE REVIEWED (HYPOTHESIS)	20
RESEARCH AND FINDINGS	20
RECOMMENDATIONS	20
ISSUE TO BE REVIEWED (HYPOTHESIS)	27
RESEARCH AND FINDINGS	27
RECOMMENDATIONS	28

ISSUE TO BE REVIEWED (HYPOTHESIS)

To have business units clearly articulate their mission; to identify their end products and associated production costs; to understand their customers and other internal and/or external entities that provide similar services; to offer suggestions as to how the Department can better satisfy the new goals, track costs, and charge time; and to provide their budgetary data by cost center for personnel, non-personnel, and contractual services.

EXECUTIVE SUMMARY

The “Bottom Up” Business Efficiency Assessment is the result of NCDOT’s ongoing efforts to transform itself into a 21st Century DOT. Beginning with the 2007 McKinsey diagnostic and building upon an informal survey to top managers in NCDOT, a formal eight-question survey was emailed in November 2007 to 60 Business Units (BUs) in the Department representing the top leadership and directors in DOT. The primary purpose of this survey was to conduct a comprehensive organizational assessment of all BUs with a focus on:

Mission – what is your BU mission, i.e. why does your Unit exist; what does your BU contribute; what customers does your BU serve;

End Products Produced – what end products (programs, services, projects, etc.) does your BU produce; to identify end products and associated production costs;

Customers Served – to understand customers and other internal and/or external entities that provide similar services;

Efficiency Ideas/Suggestions – to offer suggestions as to how the Department can better satisfy the new goals, track costs, and charge time; and

Budgetary Data – to provide budgetary data by cost center for personnel, non-personnel, and contractual services.

89 responses were submitted, and the data was synthesized over a 4-week period and subsequently translated into a preliminary set of recommendations. A large Microsoft Access database was also developed to store the raw data with the assistance of David Alford, Information Technology. This database will serve as a rich warehouse of ideas/suggestions that can be referenced in the future and used to set a baseline of what the Department was able to implement.

RESEARCH AND FINDINGS

External Reports

Several reports have been previously commissioned by various sources to determine how the Department’s project delivery rate could be improved. The reports are listed below with brief descriptions of their content and recommendations:

- North Carolina General Assembly Government Performance Audit Committee (GPAC) Performance Audit of Planning, Budgeting, and Program Evaluation Processes, prepared by KPMG Peat Marwick Management Consultants, December 1992
 - In 1991, the General Assembly authorized a year-long performance audit of all branches in state government. The purpose of the audit was to evaluate government operations, restructure and

reform service delivery, strengthen management practices, improve government efficiency and effectiveness, establish priorities, and preserve and improve the quality of the state's services. Recommendations were general in that this audit encompassed all state governmental agencies. Specific recommendations for the Department were carved out and addressed.

- NCDOT Project-Delivery Improvement Recommendations, prepared by PBSJ for the North Carolina General Assembly, July 4, 2007.
 - The General Assembly contracted with PBS& to evaluate policies and procedures implemented by the Department with a specific emphasis on project delivery.

In summary, several recommendations specific to project delivery were consolidated from these reports. The table below presents them with a brief status.

Recommendations	Report Source	Current Status
Establish a centralized procurement function to manage and administer all consultant contracts. Responsible for coordinating all procurements across all project delivery functions. To be located under the Director of Construction	Dye Management Report (p. 16)	(2005) In process.
Establish a Program Delivery Management Committee. Integrate the overall management of delivery across the functional areas and disciplines that are required to deliver an individual project.	Dye Management Report (p. 18)	(2005) Develop, implement, and update work plan. Ensure effective and efficient delivery, and manage workload. (2007) Established, but has not met on a regular basis. (PBS&J, p. 12)
Establish a Program Office for project delivery. Responsible for developing the project management discipline, controls, and procedures. Office will own the overall policy, procedures, standards, and other support mechanisms.	Dye Management Report (p. 18) PBS&J Study	(2005) Currently reviewing functions of the office and associated findings of Dye. (2007) Never established. (PBS&J, p. 12)
Institute/incorporate changes to PDEA/Preconstruction Project Manager Positions.	Dye Management Report (p. 25)	(2005) Currently reviewing functions of the office and associated findings of Dye. (2007) Positions established for a brief time, but when incumbents secured other positions, positions never filled. (PBS&J, p. 12)
PDEA & Roadway Design moving towards regionalization approach.	Dye Management Report (p. 121)	* PDEA moved to a regionalized approach in 2005/2006. Per TMT efforts Roadway Design has also shifted to a regionalized approach for project management.

- NCDOT Project Delivery Study, prepared for the North Carolina General Assembly, July 19, 2004
 - The report provided approximately 26 individual recommendations that addressed current barriers to timely project delivery. It was anticipated that acceptance of the recommendations would enable NCDOT to implement industry best practices for program and project management.

An informal survey developed by TMT Project Manager, Roberto Canales was emailed (August 2007) to selected senior management within the Department. The questions presented in the informal survey were:

- List three things you would change about the Department.
- Identify any redundancies across the Department.

- List three things you would change about your work group.
- Are there efficiencies you can implement in your work group?
- Do you have a historical picture of your workload vs. staffing? Can I get one in a week?
- How can we improve communications/interaction within the Department? (i.e. Central to field and vice versa)

Responses from this survey were used in identifying earlier workstreams that were launched prior to the formal initiation of the business unit efficiency effort.

Transformation Effort: McKinsey Survey

A quantitative survey of the Organizational Performance Profile was completed by nearly 9,000 employees, which constitutes more than 70% of the Department's employee population. In addition, 60 senior leaders were interviewed, nine focus groups comprised of transportation workers, supervisors and technicians, DMV employees, VERTs, and administrative staff were conducted, 15 "deep structured interviews" were conducted with selected employees representing all levels of the organization, and over 20 informal conversations were held with individuals from the Governor's Office, General Assembly, MPOs, and businesses to better understand concerns and priorities of external stakeholders.

The results of the survey and the other information gathering efforts resulted in several findings. McKinsey determined that the Department was at a strong starting point for transformation because the near-term budget was stable, external stakeholders were supportive of change, key leadership was committed to change, the Department had the technical skills necessary to deliver, and the employees were proud to serve and possessed a "can do" attitude.

The survey concluded that opportunities to improve operations were within the possible realignment of the Department. The report states, "NCDOT could increase its alignment, focus, and effectiveness by setting a clear direction, cascading an explicit vision and goals throughout the organization." It was clear that the Department needed to remove silos, but also understand how some of the organization's dysfunctional communication and conflict avoidance had contributed to redundancies within the organizational structure. To better understand the mission, end products, and budgetary constraints of each division, along offering units a medium to share ideas and suggestions for improvements, a focused survey of the business units' operations was launched.

Business Unit Efficiency Approach

In order to conduct a wider, more focused approach for understanding how each business unit contributes to the Department's overall mission and goals, McKinsey staff proposed a "Building Efficiencies and Productivity" (BEP) approach. The BEP approach was piloted within two Business Units—Construction and Office of Environmental Quality—between September 24 to November 9, 2007.

- Objectives of the pilot approach included:
 - Identification of the unit's mission statement, purpose, and goals.
 - Identification of all current tasks/responsibilities (which support the unit's mission statement, purpose, and goals) and estimated man-hours required to complete those tasks. Staffs in both units were instructed to complete a spreadsheet which helped track this information.
 - Determination if current unit structure is "right-sized" (or not) and aligned for mission attainment
 - Identification of opportunities for potential cost and timing savings such as:
 - Outsourcing, devolving/reassigning activities, and/or determining if a unit's products coincide with another unit and duplication can be eliminated
 - Use "lessons learned" and retool approach/templates to replicate the process with other BUs.

- The result of the two pilots led to the following conclusions:
 - Approach was better suited for a traditional manufacturing process where the focus is on producing “widgets” as opposed to providing services and meeting customer needs. Both pilot units (similar to most of NCDOT) are oriented to respond to customer needs, inquiries, or deliberating with other units to resolve project issues. The latter was difficult to track.
 - Approach for just two pilots required multiple face-to-face meetings, and follow up ½-day workshops to organize results and identify conclusions regarding the “right-sizing” of the units. Expanding such an approach to the rest of the organization would have been cumbersome and labor intensive; staff and time constraints would not have permitted such an expansion.
 - A modified approach, with a focus on soliciting business unit understanding of its mission, end products, and budgetary awareness was recommended by the Strategic Blueprint team. The modified approach involved the creation of a Business Efficiency survey which would generate similar data and input in a time efficient manner.
- Business Efficiencies Survey and analysis:
 - An eight-question, three page survey (provided in Appendix D) was sent to 60 BUs in the Department representing the top leadership and directors in NCDOT on November 16, 2007 with a due date for December 7, 2007.
 - The survey questions focused on BU mission and alignment with NCDOT’s new mission and goals. Questions also probed the BUs’ ability to articulate its end products, the cost of producing those products, similarity with end products produced by other BUs, and if those end products should be produced at all or outsourced.
 - The survey included tables to ascertain BU budgetary information and if a respective BU could navigate SAP to locate information such as Personnel, Non-Personnel and Contractual Service Costs by Cost Center(s).
 - Specific responses were needed from sub-units within larger BUs resulting in a total of **89** responses.
 - From December 10, 2007 to January 23, 2008 the Strategic Blueprint team (along with TMT’s Project Manager) reviewed and synthesized the results of each survey response. The analysis included:
 - Review to ensure each question contained a response (long, short, or NA) and especially that budgetary information seemed logical.
 - Comparison of end products, services and programs produced across BUs and across the Department. This comparison included a focus on any (real or perceived) redundancy, overlapping responsibilities across two or more BUs, outsourcing opportunities, BU-specific technology needs, and the overall use and effectiveness of the product, service or program in regards to NCDOT’s new mission and goals.
 - General observations such as:
 - Many improvement opportunities are simple, internal changes within a BU or require a simple procedural changes with executive staff/BOT approval
 - Budget “unconscious” & time charge inaccuracies are pervasive throughout NCDOT
 - Employees have great suggestions—NCDOT must find ways to empower employees to drive change post-TMT
 - Employee support for recommendations from previous management reports, such as the ones cited above (McKinsey Diagnostic, PBS&J Report, MGT Report, etc.)
 - Any key ideas or suggestions that pertained to other ongoing workstreams were lifted from the synthesis and forwarded to the appropriate TMT workstream leader.
 - All responses were organized into a Microsoft Access database (with IT’s help) for querying information in the future.
 - Initial recommendations were listed under the following **four** overarching categories/areas of improvement: Deep Dives, Internal Efficiencies, Training, and Policy/Procedural Changes

RECOMMENDATIONS

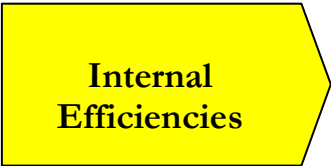
FOUR ACTION STRATEGIES FOR EFFICIENCY IMPROVEMENT



Deep Dive

An efficiency opportunity identified as a “Deep Dive” indicates the analysis addresses an issue that crosses multiple BUs and will involve a level of complexity requiring intense third party facilitation. Also:


- Facilitation can be led by Productivity Services, OEQ, and/or TMT.
- 30-day time frame for analyses, findings, and recommendations.



Internal Efficiencies

An efficiency opportunity identified as an “Internal Efficiency” means the analysis addresses an issue that is predominantly contained within the respective BU and can best be addressed by that BU. Self-facilitation is the best way to handle addressing these efficiencies; however third party facilitation can be utilized. Also:

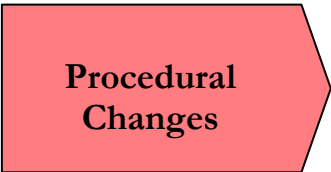
- Short time limit—entire effort and recommendations headed by BU manager for implementation.
- A TMT member will be assigned to keep up with the status of each of these efforts to ensure completion.



Training Opportunities

An efficiency opportunity identified as a “Training Opportunity” indicates that the development and training of key staff in NCDOT will provide improved efficiency and accountability benefits for the future. This training is focused on the following areas:

- Project Management training and
- Managerial/Leadership training.



Procedural Changes

An efficiency opportunity identified as a “Procedural Change” indicates the need for changes to existing procedures that may be cumbersome, outdated, or not aligned with the new NCDOT’s Mission and Goals.

RECOMMENDATIONS

DEEP DIVES

Improved Functionality of Americans with Disabilities Act Responsibilities

Results of the BEU survey indicated the following:

- Fragmented program administration across Alternative Delivery Unit, Office of Civil Rights & Business Development, Human Resources, Productivity Services, General Services, and other BUs,
 - No definitive policy or procedures for complaint filing and corrective action, and
 - Legal ramifications require formalized process.
- In the Department's realignment, ADA functionality will be housed in the Division of Civil Rights. Additionally, the workstream presented recommendations to the TMT and LT, which were approved, that streamline the ADA process as well as provide efficiencies for handling of all complaints including those under other federal and state statutes such as Title VI and Title VII. A detailed report of the workstream's findings and recommendations is presented in Appendix C.

Traffic Counts & Traffic Data Management

Results of the BEU survey indicated multiple units had a role in traffic count collection at NCDOT. Given other workstream and transformation emphasis on improving project delivery and the critical path inputs to project delivery, a further examination of this subject area was warranted. Findings included:

- Isolated approaches to count collection and the need for improved collaboration between units to meet delivery timetables and customer needs
- Lack of a unifying policy to govern the Department wide management of count collection, storage, and dissemination of data.
- Need for enhanced access and ease of viewing traffic count information in a single location.
- No clear, coordinated plan for how to optimize use of technology and current traffic collection equipment to support more real time (or near real time) information for public consumption and awareness.

A detailed report of the workstream's findings and recommendations is presented in Appendix B.

Consolidation of the Safety & Loss Control Unit and Management Assessment Division

Commonalities between the Safety & Loss Control Unit and Management Assessment resulted in the recommendation to consolidate the two units and create a new division. Natural linkages identified that exist between the units were

- Safety risky/evaluation for people and property
- Emergency Management
- Statewide Responsibilities

In the Department's realignment, the new division is named the Division of Safety & Risk Assessment. A detailed report of the workstream's findings and recommendations is presented in Appendix C.

RECOMMENDATIONS

INTERNAL EFFICIENCIES

Bicycle & Pedestrian Division

Two issues were identified as opportunities for efficiencies. The division currently reports to the Deputy Secretary for Intergovernmental Affairs and Budget Coordination. It is also unclear if the Safe Routes to School Program is better housed under this division or under the Traffic Engineering and Safety Systems Branch.

In the Department's realignment, the Bicycle & Pedestrian Division was transferred from the Deputy Secretary for Intergovernmental Affairs and Budget Coordination to the Deputy Secretary for Transit. The move aligns all non-highway modal divisions within a common management structure.

Collocation of Safe Routes to Schools Coordinator and Municipal and School Transportation Assistant Engineer

An entire unit within the Traffic Engineering and Safety Systems Branch exists to serve as experts on school safety and crash analysis. Per SAFETEA-LU, the federal government requires states to fund a full-time Safe Routes to Schools Coordinator. Collocation of the Municipal and School Transportation Assistant Engineer and Safe Routes to Schools Coordinator within the same unit may produce increased efficiency and productivity. The Traffic Engineering and Safety Systems Branch is the logical location for these roles.

A memorandum to the Leadership Team recommended that the Deputy Secretaries for Intergovernmental Affairs and Budget, and Transit along with the Highway Administrator and the Traffic Engineering and Safety Systems Branch manage the relocation of the Safe Routes to Schools Coordination role and resources (funding) to the Traffic Engineering and Safety Systems Branch.

Consolidation of Department Orientation

The Orientation Sub-team of the Talent Management Team presented its recommended orientation process for implementation, which was well-received by both the TMT and the Leadership Team. Evident in the new orientation process is the discovery of efficiency opportunities gained through collaboration, consolidation, and synergy of the separate orientation processes currently utilized by the Department and DMV. The Orientation Sub-team formulated a thorough orientation process that effectively orients new employees to the Department and underscores the EVP. Preliminary estimates indicate an implementation cost of \$7,000/year for the first year with a recurring annual cost of \$4,200.

As the Department seeks to become a "great place to work" and "a place that works well," the "One NCDOT" directive must be preserved and creative, effective, and productive methods found to accommodate specific division-orientation needs within this improved framework. Therefore, it is recommended that all division be directed to utilize this new orientation and supplement it as necessary to address division-specific needs.

Internal Transfer of Rail Utility Relocation Unit from Project Services Unit to the Rail Division

This unit recommended an internal transfer of the Rail Utilities Section from the ROW Branch, which could provide for greater efficiencies through synergy with Rail Division functions and staff. Additional efficiencies could also be realized through improved coordination between Utilities Coordination Unit and Rail Division in the investigation of at-grade RR crossings for needed safety corrections.

In the Department's realignment, the Rail Utilities Section was transferred from Project Services Unit to the Rail Division. This relocation will improve efficiency by aligning rail utility relocation functions within the Rail Division.

Ferry Division

This division indicated its interest in pursuing additional internal efficiencies and requested formal facilitation assistance in brainstorming ideas for improvement and developing a course of action. Jeffrey Roerden with the Department's Productivity Services Unit led a facilitated session to help the division identify opportunities to improve its operations. At present, the unit has identified and is pursuing opportunities for improvement within its painting operations and safety training.

General Services Division

Several issues were identified as possible areas for internal efficiency improvements:

- Determination if the 3R program is located within the Department's organizational structure for optimal efficiency. In addition, the scope of the program needs better definition e.g., inclusion of recycled construction debris.
- There appears to be no clear separation of duties in terms of facilities management and Management Assessment including parking lot and after-hours maintenance, management of facilities, security, etc.
- Materials & Test is the only DOH facility maintained by this unit. There is an interest in transferring the position to DOH/Materials & Test to allow it to maintain its own facility.
- There is no formal archival and surplus policy. Employees abandon surplus items in the hallways and we are required to keep the hallways cleared. Consequently, this unit is tasked with removing the surplus items, securing appropriate space for the times, and arranging for the items to be picked up. Too often, hallways remain cluttered and obscured because they are storing surplus or archive materials.

A recommendation was made to schedule facilitated meetings with heads of Management Assessment (concerning the separation of duties issues) and Materials & Test (concerning the maintenance mechanic position). Additionally, it was recommended that meetings between Myra Fulmer, Bob Andrews, and Management Assessment be conducted to develop a formal archival and surplus policy for approval by Executive Management and dissemination to the NCDOT employees.

General Services Division reported the following efforts in pursuing the recommended and other internal efficiency opportunities:

- As of February 2008, Department of Environment and Natural Resources delegated authority to the Department (within Roadside Environmental Unit) to approve sediment and erosion control plans. This delegation has reduced review and approval times considerably.

- A concerted effort has been made in tracking recycled oil. Additional revenue can be realized through recycling oil. Currently, the Department can recoup 34¢/gallon. It is anticipated that that rate may increase to 71¢/gallon.
- As a pilot, a renovation project in Division 4 is capitalizing on recycled materials. Current estimates are 75% of materials in the former facility can be reused and/or recycled.
- Security protocols have been reviewed with General Services Division and Management Assessment, and there is a clear understanding of duties and responsibilities.
- Material & Test and General Services Division are in agreement with Facilities Maintenance to continue maintaining M&T's facilities.
- The development of an electronic filing system and hard copy of files have been included in the Division's action plan.

GIS Layers

Conversion of the TIP maps to GIS layers was identified as an internal efficiency opportunity. The conversion would permit intelligence to be attached to the maps and provide detailed project information. Program Development Branch reported that GIS will use Spatial Data Viewer (SDV) as a means to display the next TIP in a GIS-based manner.

Oversize/Overweight Permits Unit

The effort to automate the permitting process has been stalled. The internal efficiency opportunity identified was to determine the status of the automation project and eliminate any obstacles. A meeting was held with the current vendor. However, some outstanding issues still exist. The unit will continue meeting to resolve problems so that the automation process can be successfully completed and implemented.

Rail Division

The Rail Division's current project load exceeds its current staffing complement. It was recommended that a business case be developed to address how this project load backlog could be addressed. The division director assessed his current project load, project backlog, and anticipated projects, reviewed his current budget and future funding forecasts, and found the following:

- The statewide crossing safety program has a backlog of project. At the current staff capability, the backlog is equal to three years.
- One of the largest-scale projects in the county, the 500-mile Southeast High Speed Rail Corridor, has a single employee for project management.
- The Department's passenger operation has a single employee to oversee contract operations in two cities through two shifts, seven days per week, 365 days per year.
- A single employee contracts out 95% of his assigned project work load.
- Two national demonstration projects with broad regional and public impact have no project managers. These projects are programmed for a combined public and private investment in excess of \$100M.
- A state-funded FTE position with benefits costs approximately 50 percent of that provided by consulting engineering firms.

A table of recommended personnel assignments to match Rail Division resources was provided with the assurance that approval would ensure sufficient personnel to address all project needs identified.

State Bridge Management Unit (formerly State Bridge Maintenance Unit)

This section reported that divisions are losing expertise to help maintain specialized electromechanical equipment on movable bridges and bridge inspectors are stretched thin, and recommends that this service should be outsourced over time. Another recommendation offered by this BU was to enhance recruitment efforts for technicians proficient in electronics and computers. The final internal efficiency recommendation offered by this unit was to hire a structural Engineer to oversee these contracts so that bridge inspectors can be focused solely on load bearing bridge inspection/maintenance.

After pursuing the recommendations, State Bridge Management Unit prepared a draft recruitment plan to HR to improve recruitment efforts for technicians proficient in electronics and computers. The unit is also looking at reorganizing and reallocating several positions to address workload problems being experienced by the inspection teams. There is also some consideration being given to increasing the use of PEFs to perform inspections.

Traffic Engineering & Safety Systems Branch

Re-timing of existing signal systems, collection of traffic count data, and determining a single author of joint DMV/TESSB reports were identified as opportunities for internal efficiencies for this unit.

Although the retiming of signal systems has been transferred back to the divisions, this task requires a specialized skill for which the field has limited staff. TESSB recommends pooling the expertise in three regions. By developing regional signal systems engineering positions, new staff members would dedicate their time to evaluating and retiming signal systems. It is estimated that this recommendation will shorten the frequency of retiming signals from five to six years to 18 months.

The collection of traffic count data was identified as a “deep dive” work stream and will be addressed later in another section of this report.

Concerning the joint reports for which DMV and TESSB contribute, TESSB is working with DMV to determine how to best produce reports that require input from both units.

Utilities Coordination Unit

This unit identified the following issues:

- Development of a uniform approval process across the divisions.
- Revision of the current manual, which was last revised in 1993.
- Development of training program with a concentration on utility issues.
- Improvement of the encroachment approval process.
- Development of alternative techniques to handle utility conflicts.
- Recovery of costs associated with the Department’s professional engineering services expended in the preparation of utility construction plans.
- Establishment of a utility committee to review needed legislation to better handle utility-related issues.

The Utilities Coordination Unit met and developed an action plan to address the identified issues. In summary, it was determined that the existing encroachment agreements are outdated and will require revision. This project will, however, be delayed until the current manual is revised, which is the more pressing matter. The

unit is moving forward to re-write the *Policies and Procedures Manual for Accommodating Utilities on Highway Rights of Way*, which is anticipated to take six to eight months to complete.

Georgia DOT (GDOT) has developed a course through coordination with a utility consultant firm that could be a model for replication here. Included in the unit's action plan is the intent to visit GDOT, audit one of its training classes, and evaluate how this paradigm could be used effectively within the Department.

The unit believes that the encroachment approval process can be improved by replacing the current paper process with an electronic, paperless process. The current process is antiquated, and the sheer volume (estimated at 8,000/year) and complexity of the requests exceed the current man power available. The City of Charlotte has an electronic process that is worth investigating for application here. An electronic system would allow utility companies to access our system and GIS technology could be incorporated. The addition of ROW staff within each highway division would help streamline the process and allow the Department to shorten approval times as well.

Project delays have been incurred as a result of conflicts with utilities. The unit believes that this can be alleviated in part by requiring the design consultants to handle all utility conflicts for projects designed by PEFs. Two pilot projects have been awarded to PEFs that require them to coordinate their work with the utility companies as part of the design phase of the project. These pilots will be evaluated to determine effectiveness and implementation potential on a larger scale. Other options (having highway contractors handle complaints on design-build projects) are being pursued.

The unit contends that the Department has provide free engineering services to companies requesting to have their water and/or sewer facilities relocated by the highway contractor during the construction of highway projects. This free service is provided regardless if the utility company is responsible for all costs associated with the relocation of their facilities. The unit contemplates instituting a reimbursement program to recoup costs associated with the preparation of relocation plans if the plans are developed by the Department. One suggestion is to seek reimbursement based on an hourly rate. Although this reimbursement is not viewed as a revenue source, it could allow the Department to recover some of the costs associated with this professional service.

The final recommendation was to establish a committee to review needed legislation. This committee would study legislation of other states and make recommendations for action. All recommendations for legislative action would be forwarded to the Department's Legislative Liaison for the Department.

PROCEDURAL CHANGES

Some of the internal efficiencies identified were recommendations for procedural or legislative changes. Below, the recommendations are presented along with next steps:

Division 4

Proposed Legislation recommendation:

- This would require a change in a purchasing law, but divisions should be able to let larger dollar value contracts (cap is \$1.2M currently). We could produce similar contracts and provide increased delivery.

DOH's Operations established a "Contract Officer" role in each of its highway divisions. Chief Engineer, Steve Varndoe, reported that this was done in an effort to improve uniformity and consistency across the state. All

contracts within the division would be let by this contract officer. However, it is important to note that the MBE/WBE Legislative Committee presented to the Department similar legislation to increase the dollar value.

Office of Delivery Workstream

Proposed Legislative recommendation:

The Department should seek legislation to broaden its authority for the use of professional services to cover all professional services and functions in connection with the planning, design and construction of transportation facilities. The Department lacks legislative authority for all functions involved in the planning, design, right of way acquisition and construction of transportation facilities to fully utilize the resources of PEFs.

At present, NC G.S. 136-28.1(f) authorizes “contracts for professional engineering services and other kinds of professional or specialized services necessary in connection with highway construction, maintenance or repair.” While this fully covers the Division of Highways, other units that fulfill an important role in the Department’s goals are technically not covered in the practice of contracting firms for the planning, design and construction of non-highway projects. For example, the General Services Division uses State Construction Office authority and procedures for its various projects across the state. The Right of Way unit utilizes smaller professional services contracts for services in support of its objectives. There is no blanket delegation or authorization beyond G.S. 136-28.1(f).

Public Transportation Division

Proposed Legislation recommendation:

- New Starts (Rail) funding criteria when no federal funds are involved in the project: The end product is revised legislation and written criteria that clearly identify requirements for state funding to support commuter and light rail projects when the project does not meet federal requirements. The criteria for federal support of these types of projects are becoming more stringent due to the lack of available funding. In consideration of the delay with the Triangle Transit Authority regional rail project and the likelihood that at least one of the remaining Charlotte corridor projects will not meet the federal requirements for funding, one should not infer that the project is not viable. There is less than adequate funding level for this federal program when compared to the demand nationally for New Starts funding. Creation of state funding criteria for regional and commuter rail projects will help to ensure that North Carolinians have mobility options in the state’s most congested corridors even if federal funding is inadequate or unavailable.

Utilities Coordination Unit

Proposed Legislation recommendation:

- Consider enacting a state law that holds utility companies financially responsible for any delays or additional costs caused by conflicts.

TRAINING

As a result of the responses received in the survey, a training workstream was launched to address concerns raised in the survey. The findings of that workstream will be presented in another document.

APPENDICIES

A – ADA

B – Traffic Counts

C – Safety and Loss

D – Actual Survey sent out on Nov 16 plus the list of 60 BUs

E – MS Access DB (or put this on a CD)

F – Actual survey submittals (on a CD)

G – Final TMT and LT products and presentations

APPENDIX A

BUSINESS UNIT EFFICIENCY WORKSTREAM: ADA FUNCTIONALITY

ANALYSIS & RECOMMENDATION
OCTOBER, 2008

Table of Contents

ISSUE TO BE REVIEWED (HYPOTHESIS)	3
ISSUE TO BE REVIEWED (HYPOTHESIS)	3
EXECUTIVE SUMMARY	3
RESEARCH AND FINDINGS.....	3
RECOMMENDATIONS	7
<i>Four Action Strategies for Efficiency Improvement</i>	7
<i>Deep Dives</i>	8
<i>Internal Efficiencies</i>	9
<i>Procedural Changes</i>	13
<i>Training</i>	14
APPENDICIES.....	16
ISSUE TO BE REVIEWED (HYPOTHESIS).....	20
RESEARCH AND FINDINGS	20
RECOMMENDATIONS	20
ISSUE TO BE REVIEWED (HYPOTHESIS).....	27
RESEARCH AND FINDINGS.....	27
RECOMMENDATIONS	28

ISSUE TO BE REVIEWED (HYPOTHESIS)

The results of the Business Unit Efficiency Survey indicated that the ADA program administration was fragmented across several business units including: Alternative Delivery Unit, Office of Civil Rights & Business Development, Human Resources, Productivity Services, General Services, and others, there appears to be no definitive policy or procedures for complaint filing and corrective action, and potential legal ramifications require formalized process

RESEARCH AND FINDINGS

In the Business Unit Efficiency Workstream, Safety ADA functionality was identified as a “deep dive” candidate because of the issues identified in the hypothesis. A work group was created with the following membership:

Name	Division/Branch/Unit/Section
Philip Bickham	Human Resources Division
Jeff Cox	Bicycle & Pedestrian Division
Joseph Ishak	Work Zone Safety
Tim Luckwaldt	Aviation
Miriam Perry, Director	Public Transportation
Jimmy Travis	Alternative Delivery Unit
Anthony Roper, Deputy Secretary (Ad Hoc/Advisory)	Administration & Business Development

The workstream methodology included:

- Discussed research findings
 - Interviews with stakeholders (Alternative Delivery Unit, Aviation, Bicycle & Pedestrian, Ferry, Office of Civil Rights & Business Development, Productivity Services, Public Transportation, Rail, and Work Zone Safety)
 - Literature research (Americans with Disabilities Act, Title VI, NCDOT website, *Title VI Nondiscrimination in the Federal-Aid Highway Program* and *Access for Individuals with Disabilities under Section 504 of the Rehabilitation Act and Title II of the ADA*)
- Reviewed Regulations
- Summarized findings
- Identified gaps
- Developed initial recommendations
- Finalized recommendations

RECOMMENDATIONS

Based on the findings from an initial survey, interviews with stakeholders, and literature research conducted, several recommendations were proposed. The recommendations provide an opportunity to streamline the process including improving response time and record keeping.

- **Post a Letter of Position authored by the Secretary.** This letter would articulate the Department’s commitment to ADA and possibly satisfy the immediate compliance need for an ADA policy statement as noted in the results of the FHWA baseline assessment report.
- **Establish an ADA Oversight Committee.** The committee would be composed of stakeholders. The goals of the committee would be to coordinate with other stakeholders including those external to the agency (e.g., FTA, FRA, FAA, FHWA, State Construction Office, Department of Insurance, etc.),

information sharing, and imbue ADA awareness within the departmental culture. The committee's functions would include:

- Review of current regulations, frequent briefings from similar programs, trends analysis, and funding requests,
 - Develop recommendations of policies and procedures, and training,
 - Define requests and complaints for reasonable accommodation,
 - Define threshold for tracking, and
 - Develop compliance auditing process. (Update existing transition plan utilizing FHWA baseline assessment as the datum.) This activity would be an immediate action item.
- **Modify the Current ADA Training.** Revamp internal ADA training course and other courses with correlated topics. Review ADA training provided to our grantees/sub-recipients and external customers taught by DOT and others.
 - **Create a Single Point of Contact for Discrimination & Accommodation.** This position would streamline and simplify current process, and create synergy. In addition, the SPOC would act as a clearinghouse for all complaints, issues, questions, and requests (e.g., Titles VI and VII, ADA, discrimination, accommodation, etc.) All complaints would be tracked by the SPOC and assigned accordingly and appropriately. This recommendation would ensure the continuity of all training, printed materials, website policies, procedures, and other public and private forms of communication.

The Leadership Team accepted our recommendations with the following caveats:

- Since a statewide ADA coordination has been appointed by the Governor, we need to seek audience with this individual and share with him/her the results of the FHWA baseline assessment and the Department's plan for this functionality.
- Develop a timeline and prioritization of initiatives identified in our presentation.
- Discuss with Mark Foster the tool used by the State Employees Credit Unit. He described the tool as a universal help line that also tracks complaints.
- Include representation from FHWA on the oversight committee and determine if FHWA is the lead agency representing FRA, FTA, FAA, and other federal agencies in the administration of ADA.
- Determine if and when a response is due to FHWA concerning the findings of the FHWA baseline assessment.

APPENDIX B

[Insert Traffic Counts Report here]

APPENDIX C

BUSINESS UNIT EFFICIENCY WORKSTREAM: DIVISION OF SAFETY & RISK ASSESSMENT

ANALYSIS & RECOMMENDATION
OCTOBER, 2008

Table of Contents

ISSUE TO BE REVIEWED (HYPOTHESIS)	3
ISSUE TO BE REVIEWED (HYPOTHESIS)	3
EXECUTIVE SUMMARY	3
RESEARCH AND FINDINGS.....	3
RECOMMENDATIONS	7
<i>Four Action Strategies for Efficiency Improvement</i>	7
<i>Deep Dives</i>	8
<i>Internal Efficiencies</i>	9
<i>Procedural Changes</i>	13
<i>Training</i>	14
APPENDICIES.....	16
ISSUE TO BE REVIEWED (HYPOTHESIS).....	20
RESEARCH AND FINDINGS	20
RECOMMENDATIONS	20
ISSUE TO BE REVIEWED (HYPOTHESIS).....	27
RESEARCH AND FINDINGS.....	27
RECOMMENDATIONS	28

ISSUE TO BE REVIEWED (HYPOTHESIS)

To gain a better understanding of the role and responsibilities of the Safety & Loss Control Unit and Management Assessment Unit, and identify streamlining opportunities. The structural, functional, and management opportunities for improvement were reviewed.

RESEARCH AND FINDINGS

In the Business Unit Efficiency Workstream, Safety & Loss Control and Management Assessment Units were identified as “deep dive” candidates because of the natural linkages that existed between the two units. A work group was created with the following membership:

Name	Division/Branch/Unit/Section
Bob Andrews, Director	Safety & Loss Control Unit, Division of Highways
Mickey Brock, Director	Management Assessment Unit
Jeannie Bailey	Security Unit, Management Assessment
Anthony Roper, P.E., Deputy Secretary (ad hoc)	Administration & Business Development

In addition to information extracted from the responses provided in the Business Unit Efficiency Surveys, research data was obtained from interviews with staff from the Safety & Loss Control (Bob Andrews and Larry Purvis) and Management Assessment (Mickey Brock and Jeannie Bailey) Units. Additional information was obtained from job descriptions of Security Managers from private industry using *Monster.com*.

The key findings noted between the units were:

- Natural Linkages
 - Safety risk/evaluation for people and property
 - Quality control: prevent loss of life and injury.
 - Emergency Management
 - Compliance/coordination of Homeland Security Act
 - Preparedness and education of employees
 - Statewide Responsibilities
 - Safety & Loss Control Unit currently under the Division of Highways, but acts as “safety consultant” to the entire Department
 - Security Unit under Management Assessment is responsible for all DOT facilities in 100 counties.
- Measuring effectiveness/compliance
 - More routine feedback mechanisms are needed for training and services
 - Currently, no formal performance review of surveillance vendors and contractors, or security contractors
 - Inability to associate expenditures and identify return on investment (ROI)
- Employee awareness and education
 - Improve clarity of the roles/responsibilities of both units and who serves as point of contact for crisis situations
 - Improve opportunities for emphasizing vigilance and safety threat awareness among rank and file
 - Should start when DOT onboards new employees and continues throughout employees’ tenure

RECOMMENDATIONS

Based on the findings from an initial survey, follow up interviews, and research conducted, several recommendations were proposed. The recommendations provide an opportunity to improve the delivery, coordination, and overall management of current services provided by these respective units.

- **Bring the role/responsibilities of the current Security and Safety and Loss Units under one Division.** This Division would report directly to the Deputy Secretary of Administration and Business Development. The name would be modified to better reflect the services provided, and emphasizes the Department's commitment in providing its employees with a safe and secure working environment and protecting its physical assets (currently limited to facilities, but moving towards all physical assets). Suggested name titles include: Division of Safety & Security, Division of Risk Assessment, Division of Risk Management, Division of Loss Prevention, and the Division of Incident Prevention. As initial action items, staff members in this Division should consider preparing:
 - New mission statement and service goals;
 - Adjusted performance metrics (with the help of Performance Metrics team in TMT);
 - Potential role/responsibility changes for particular positions (or long term development of new positions) based on this move to one Division; and
 - Action plans for short-term and long-term goals.
- **Upgrade the position classification and visibility of the current head of Security and reorganize this functionality to a whole section under the newly-formed Division.**
 - This position currently handles:
 - routine security and handling of safety threats for facilities in all 100 counties for NCDOT;
 - special requests to escort employees (after hours, for terminations, etc);
 - oversight of security service providers and equipment (Tech Systems and Weiser Security); and
 - oversight of property guard and State Capitol Police.
 - The current position requires reallocation. Human Resources suggested the position of Administrative Officer II as the best option. The Administrative Officer classification offers the most flexibility in allowing modification of the job description with an attractive salary. The tentative title for the position is Security Manager and examples of similar positions within the public section were researched for minimum educational requirements and knowledge, skills, and abilities. Initial discussions concerning the position description verbiage and other sections of the PD-102R-92 reviewed with Human Resources.
- **Improve and increase the evaluation and effectiveness of Tech Systems and Weiser Security.** These contracted services need further review (quarterly or additional customer feedback forums) to properly evaluate if NCDOT is getting a strong return on investment. A visible set of metrics and performance criteria is recommended to address this issue.
- **Consider additional role, responsibilities and training to support Homeland Security measures and requirements for State Agencies.** A thorough evaluation of the risk preparedness of NCDOT is recommended in light of the vulnerability of the state's transportation system. This work is best suited to be completed by this Division. This will be included in the newly reallocated role of Security Manager.

Below is a brief summary of notes from the work group sessions:

1. “Synergy Affect”
 - a. Elevate the importance of Safety Loss & Control/Management Assessment (Security) service to ALL areas/modes of NCDOT (not just DOH). *One DOT idea.*
 - b. Improved communication/coordination is required to achieve a higher level of safety and quality control for the entire Department
 - c. Preservation of our facilities (physical plant) and our people (employees/visitors) should be a shared vision and is better accomplished through a collaborative effort
2. “Elevate Security” – through the creation of a standalone unit dedicated to Security Operations
3. “ROI”& “Identifying the Gaps”
 - a. Combined unit can prepare business case, budgetary needs, annual evaluation of 1) where DOT is today (baseline level of service (LOS)) and 2) where the DOT should be (future LOS target).
 - b. Thorough evaluation of surveillance systems and security support currently provided. Is this the best way to handle security/monitoring our buildings and people?
4. “DOT preparedness for 21st Century Threats”
 - a. Addressing Homeland Security measures
 - b. Addressing any other federal requirements from FTA, FHWA, FRA, etc.
 - c. Addressing any proposed state legislation
 - d. Natural disasters, terrorist acts, vandalism, coordination with state/local law enforcement

APPENDIX D

APPENDIX G

“Bottom Up” Business Unit Efficiency Assessment

Presentation to Leadership Team of
Findings & Recommendations for
Workstream Candidates

February 13, 2008

Priscilla Tyree

Alpesh Patel

Today's Objectives

- Review the Business Unit Efficiencies Purpose, Timeline, and Approach
- Summarize the results from the completed surveys
- Recall approved workstreams to date
- Recommend three additional workstreams
- Obtain your approval to move forward

How did we get here?

- One objective of the Strategic Blueprint Team was “*to evaluate possible organizational changes to reach strategic goals, including defining key roles and responsibilities.*” (pg. 13 TMT Kickoff Meeting Slide presentation - 6/12/07)
- 8/15/07 & 10/3/07 Directives from Leadership Team
- Modified BEP/MEA concept recommended by McKinsey

Purpose

- Follow through on improvement opportunities identified in the diagnostic
- Engage employees on key tasks and responsibilities in light of our new mission and goals
- Identify cost cutting/time saving opportunities across the Department
- Complement performance metrics and need for increased accountability

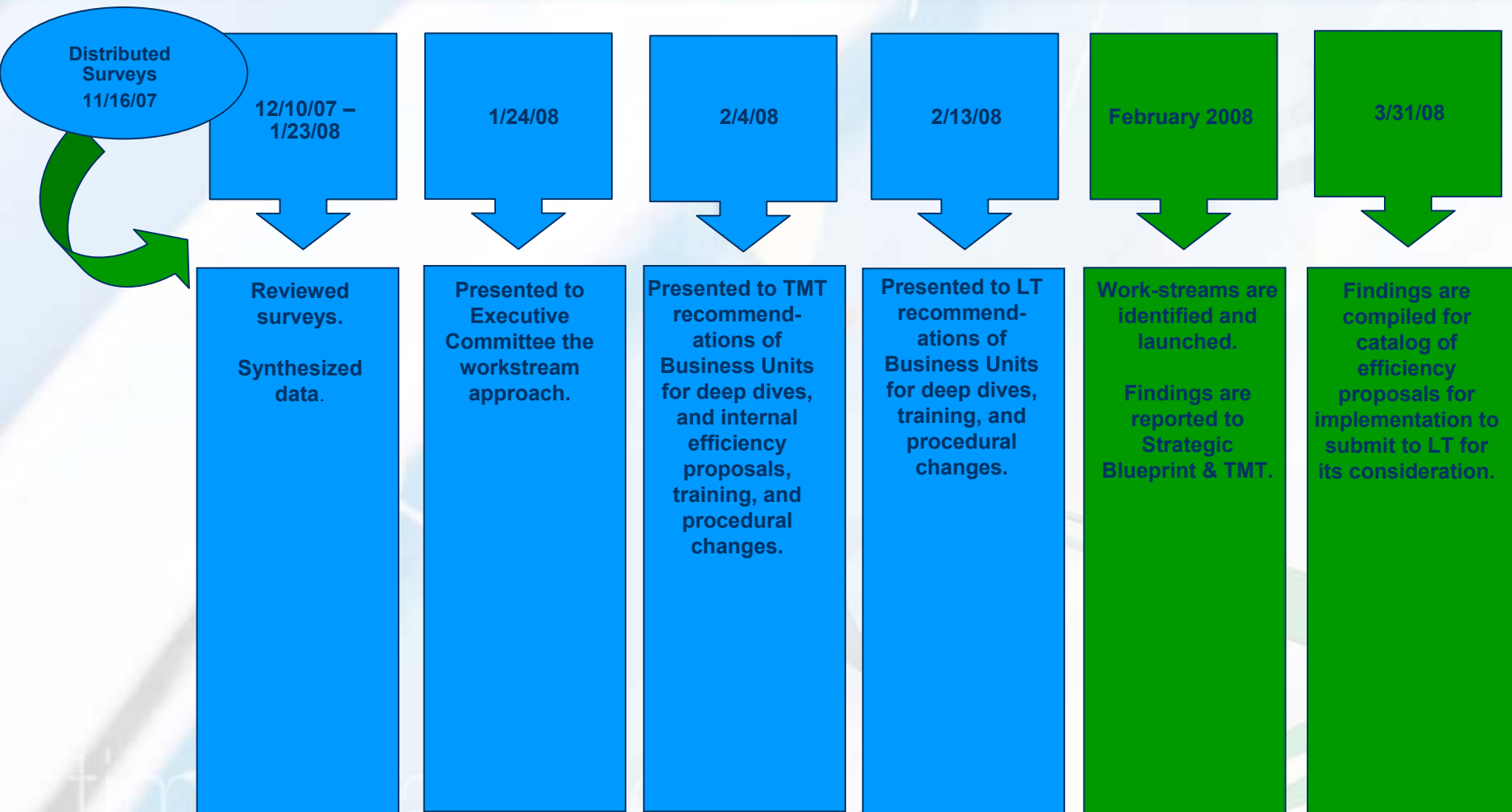
Timeline

- Conducted BEP Pilots → Oct/Nov 07
- Survey sent to **60** BUs → Nov 16 07
- Reviewed & Synthesized **89** Survey Responses → Dec 10 to Jan 23

MET TEAM GOAL!!

**Completed synthesis
by Jan 31**

Detailed Timeline



Approach

8-question survey focused on 5 areas:

- Mission – What is your BU's mission?
- End Products – What does your BU produce?
- Customers Served
- Efficiency Ideas/Suggestions
- Budgetary Data

Approach

Deep Dives

- May cross multiple BUs
- Will involve intensive facilitated analysis led by the TMT
- 30-day time frame for analyses, findings, and recommendations

Internal Efficiencies

- Internal efficiencies proposed by the BU either for itself or others
- Will be facilitated either by neutral party or by the BU itself.
- Shorter time limit—complete effort and provide recommendations to the Business Unit heads for implementation.
- A TMT member will be assigned to keep up with the status of each of these efforts to ensure completion.

Training Opportunities

- SAP & Budget Accountability training
- Project Management training
- Managerial/Leadership training
- Procurement training
- Value Engineering

Procedural Changes

- Suggestions for procedural or legislative changes

Key Observations

- Majority of recommendations are simple changes
 - Internal changes within a BU or
 - Procedural changes requiring Exec staff/BOT approval
- Budget “unconscious” & time charge inaccuracies are pervasive
- Employees have great suggestions:
 - General suggestions for improvements Department-wide AND BU-focused
 - Post-TMT finding ways to empower employees to drive change!

Key Observations

- Findings support recommendations from previous management reports:
 - McKinsey Diagnostic
 - Dye Management
 - MGT Report
 - PBS&J Report
- Findings meshed with earlier informal survey
- **ALL** submittals housed in ACCESS database
 - Thanks to David Alford (IT)
 - Queries on end products produced and respective costs

Bottom Line

- Validated previous workstreams
- Inspired on-going workstreams
- Identified NEW workstreams

Workstreams Previously Approved by Leadership Team

- Strategic Planning Office (*Voelker*)
- Prioritization (*Patel/Voelker*)
- Bridge Program (*Powell*)
- TIP Program (*Holder/Mabry*)
- Mobility Program (*Damron*)
- Agreements Management (*V. Barbour*)
- Information Technology (*Tyler*)
- Office of Inspector General (*Tyler*)
- Project STaRS (*Allen*)
- Document Reproduction (*V. Barbour*)
- Project/Program Delivery (*Tyler*)
 - Centralized Consultant Services
- Equipment Management (*Gibson*)
- Policy & Procedures Office (*Dickens*)
- Transportation Planning/
Programming~Division Planning (*TBA*)
- Budgeting (*Gibson/King*)
- Marketing (*Damron*)
- Pavement Management
Program (*Corely-Lay*)
- Facilities Management (*TBA*)
- Value Engineering/Productivity
Services/OEQ Program (*TBA*)

Recommended Workstreams

ADA Functionality

Safety & Loss

Traffic Counts

Deep Dive Workstream Candidate

- ADA Functionality

- Fragmented program administration across ADU, OCR, Human Resources, Productivity Services, General Services, and other BUs
- No definitive policy or procedures for complaint filing and corrective action
- Legal ramifications require formalized process

Deep Dive Workstream Candidate

- Safety & Loss

- Addition of security function of Management Assessment because of its responsibility for safety of employees, visitors, and property
- Should focus be administrative or technical?

Deep Dive Workstream Candidate

■ Traffic Counts

- Shared use of traffic count equipment with Traffic Engineering and Safety Systems Branch and Transportation Planning Branch
- Determine better ways to provide traffic count needs in a timely manner
- Is there any additional technology that we can leverage to improve dissemination of traffic count information?

Internal Efficiencies

- Empowering managers to encourage and initiate innovation at their levels of responsibility
- Either **inwardly-focused** towards improvements to a BU's operation or **broadly-focused** on Department-wide or multiple BU improvement
- 13 Internal Efficiencies moving forward
 - 2 require LT involvement
- Will be facilitated by affected business unit(s) or by neutral party
- Report results back to TMT within 15 - 30 days
- BU Manager should include internal efficiency implementation in the unit's Action Plan

Internal Efficiencies for LT

Organizational changes to achieve synergies currently unattainable

- Internal transfer of Rail Utilities Section from Project Services Unit to Rail Division
- Transfer of Bicycle & Pedestrian Division from the Deputy Secretary for Intergovernmental Affairs and Budget Coordination to Deputy Secretary for Transit

Training Opportunities

- SAP Training
- Procurement Training
- Value Engineering - *Sharpening our pencils*
- Accounting and Budget Management
- Project Management (Bridge & TIP pilots and Office of Project/Program Delivery)
- Leadership (TMT Talent Management)
- Supervisory & Manager (TMT Talent Management)

Procedural Changes

- Procurement law change to remove NCDOT from DOA P&C oversight to expedite purchases and contracts - possible changes also to e-procurement warranted
- Changes in purchasing law to increase threshold for letting at the DOH division level
- Legislation to pass on costs incurred when utility companies' conflicts result in project delays
- Legislative changes to New Starts funding criteria

Next Steps

- February – Obtain from LT final approval of new workstreams
- Assemble teams for approved workstreams
- Send memoranda to BU managers to implement Internal Efficiencies
- Track timetables and conclusions
- Compile all results in a final report for submittal LT by March 31

Comments and Questions?



Uncertainties — action items in RED

- How to move forward on areas where we are unsure? Example - if training is across two units, Construction and Geotechnical, how do we know this is not a duplication of effort? – **Take no action**
- Is Bike & Ped move back to Roberto already underway? -- **Recommend IE** (Memo to Susan from RC')
- Will the bigger question of how the non-hwy modes & TPB interact come under the *Transportation Planning Workstream* issue? – **Forward to Transportation Planning/Programming Workstream**
- **Contract Office** – wants to qualify prime contractors, an activity currently performed by Construction Unit. Is there any value in doing this? -- **Take no action**
- **CEI Recommendation from Ellis**. Is this a discussion between two affected parties or what? -- **Forward to PPD Workstream**
- **Communications Office recommendations** - metrics, more customer service and support oriented? – **Memo to LT from RC**
- Need for a stand-alone **Office of Procurement** or improved procurement practices via training?– **Forward to PPD Workstream**
- How to make TESS Branch more lean and mean by pushing some duties to the division or other branches and direct its focus statewide issues – **Memo to Chief from RC**
- Municipal/School Transportation Engineer should be responsible for Safe Routes to School Coordination? – **Memo to LT from RC**
- **Facilitation assistance** for Ferry and others - Order of delegated responsibility TMT, OEQ, Productivity **Services...Set up meeting with Ferry Division**
- **3R program** – relationship with what is done here and what ADU is doing? What level of coordination exists for this effort. How far do we go to be green? Is this a cultural change belonging in Office of Change Management or it is a PPD? Where does this belong? – **Memo to John Sharp from RC...come up with game plan to elevate 3R**
- How do we respond to BUs where no significant findings were discovered? How do we close that loop? – **List all BUs with no significant issues and follow up Memo to LT for RC??**
- **R&D** – **forward to Transpo Planning Workstream**
- **What happens next?** Are these recommendations to be translated into a revised organization chart?

Deep Dive Candidate_ take no action

- Hydraulics & Natural Environment Units
 - Recommendation to relocate Natural Environment Unit to Century Center and establish it as a new unit in the Design Branch
 - 3rd party facilitation between Hydraulics and NEU

Deep Dive Candidate_ forward to PPD

- Office of Environmental Quality/Productivity Services (Change Management)
 - Skill-set required to assume duties and responsibilities of TMT once it is dissolved
 - Proposed organizational location: Human Resources
 - Dashed line relationship with SPOT

Deep Dive Candidate_ forward to TP Workstream

- Research & Development
 - R&D functionality spread across several divisions
 - Primarily R&D grants administration housed in Transportation Planning
 - Other R&D opportunities under Materials & Test
 - Long-term possibility - locate this functionality in SPOT

Deep Dive Candidate_ set up mtg w/ Angela Faulk

- DMV - License & Theft - Emissions
 - Recent publicity citing overstaffing for current workload
- DMV - Administration
 - Human Resources functionality redundant with Department Human Resources functionality
 - Seems to be in opposition to ONE North Carolina philosophy

Deep Dive Candidate_ ask Mark T for Office of Biz Intelligence definition and then take no action or forward

- Office of Business Intelligence (waiting for TG to verify and follow-up)
 - Linking databases and data systems together (e.g., MMS, PMS, BMS, etc.)
 - Real-time application of asset management principles

Deep Dive Candidate_ forward to Joey

- Board of Transportation
 - Shift focus to strategic issues
 - Reduction of the number of redundant approvals
 - Adjustment of meeting frequency

Deep Dive Candidate_ Memo to LT from RC

- Communications Office
 - Determine viability of recommendations from Communications Office for additional duties
 - Customer-focus driven
 - Possible name change to reflect current end products and functionality: Public Affairs Office, Public Information Office, or Public Relations Office

Efficiencies Realized

- Internal transfer of Rail Utilities Section to Rail Division
 - Proximity creates synergy with staff functions
- Biennial Vehicle Inspections
 - Currently not performed by Public Transportation Division
 - Could be an opportunity for DBE/WBE
- Reduction of redundant BOT approvals

“Bottom Up” Business Unit Efficiency Assessment

Transformation Management Team
Findings & Workstream Candidates

Priscilla Tyree
Alpesh Patel



Timeline

- Conducted BEP Pilots ➡ Oct/Nov 07
- Survey sent to **60** BUs ➡ Nov 16 07
- Reviewed & Synthesized
89 Survey Responses ➡ Dec 10 to Jan 23
 - TEAM GOAL: Complete synthesis by Jan 31

Bottom Line

- Validated previous workstreams
- Inspired on-going workstreams
- Identified NEW workstreams

Key Observations

- 14% of recommendations are simple changes
 - Internal changes within a BU or
 - Procedural changes requiring Exec staff/BOT approval
- Budget “unconscious” & time charge inaccuracies are pervasive
- Employees have great suggestions:
 - General suggestions for improvements Department-wide AND BU-focused
 - Post TMT finding ways to empower employees to drive change!

Key Observations con't

- Findings support recommendations from previous management reports:
 - McKinsey Diagnostic
 - Dye Management
 - MGT Report
 - PBS&J Report
- Findings meshed with earlier informal survey
- **ALL** submittals housed in ACCESS database
 - Thanks to David Alford (IT)
 - Queries on end products produced and respective costs

Approach

8-question survey focused on 5 areas:

- Mission – What is your BU's mission?
- End Products – What does your BU produce?
- Customers Served
- Efficiency Ideas/Suggestions
- Budgetary Data

Workstreams Previously Identified

- Strategic Planning Office
- Prioritization
- Bridge Program
- TIP Program
- Mobility Program
- Agreements Management
- Information Technology
- Office of Inspector General
- Project STaRS
- Document Reproduction
- Project/Program Delivery
 - Centralized Consultant Services
- Equipment Management
- DOT Policy & Procedures Office
- Transportation Planning/Programming~Division Planning
- Budgeting
- Marketing
- Communications Office/PIO
- Pavement Management Program
- Facilities Management
- Value Engineering/Productivity Services/OEQ Program

Business Unit Efficiencies Workstream Approach

Deep Dive

- May cross multiple BUs
- Will involve intensive facilitated analysis led by the TMT
- 30-day time frame for analyses, findings, and recommendations

Internal Efficiencies

- Internal efficiencies proposed by the BU either for itself or others
- Will be facilitated either by neutral party or by the BU itself.
- Shorter time limit—complete effort and provide recommendations to the Business Unit heads for implementation.
- A TMT member will be assigned to keep up with the status of each of these efforts to ensure completion.

Training Opportunities

- SAP & Budget Accountability training
- Project Management training
- Managerial/Leadership training
- Procurement training
- Value Engineering

Procedural Changes

- Suggestions for procedural or legislative changes

Workstreams Recommended by BEU

ADA Functionality

Safety & Loss

Traffic Counts

Deep Dive Workstream Candidate

- ADA Functionality

- Fragmented program administration across ADU, OCR, Human Resources, Productivity Services, General Services, and other BUs
- No definitive policy or procedures for complaint filing and corrective action
- Legal ramifications require formalized process

Deep Dive Workstream Candidate

- Safety & Loss

- Addition of security function of Management Assessment because of its responsibility for safety of employees, visitors, and property
- Should focus be administrative or technical?

Deep Dive Workstream Candidate

■ Traffic Counts

- Shared use of traffic count equipment with Traffic Engineering and Safety Systems Branch and Transportation Planning Branch
- Determine better ways to provide traffic count needs in a timely manner
- Is there any additional technology that we can leverage to improve dissemination of traffic count information?

Internal Efficiencies

- Either **inwardly focused** towards improvements to a BU's operation OR **broadly-focused** on Department-wide or multiple BU improvement
- 13 Internal Efficiencies moving forward
- Will be facilitated by affected business unit(s) or by neutral party
- Report results back to TMT within 15 - 30 days
- BU Manager can use as part of the unit's Action Plan

Inefficiency Examples

- Key in POs TWICE in E-procurement
- Procedure manuals that are 15 years old
- Certain BUs are “spread too thin”
 - Greater focus on statewide issues and push some decisions to Divisions
- Safe Routes to School Coordinator is not located within Traffic Engineering & Safety Systems Branch

Efficiencies Realized

- Internal transfer of Rail Utilities Section to Rail Division
 - Proximity creates synergy with staff functions
- Biennial Vehicle Inspections
 - Currently not performed by Public Transportation Division
 - Could be an opportunity for DBE/WBE
- Reduction of redundant BOT approvals

Training Opportunities

- SAP Training
- Procurement Training
- Value Engineering - *Sharpening our pencils*
- Accounting and Budget Management
- Project Management (Bridge & TIP pilots and Office of Project/Program Delivery)
- Leadership (TMT Talent Management)
- Supervisory & Manager (TMT Talent Management)

Procedural Changes

- Procurement law change to remove NCDOT from DOA P&C oversight to expedite purchases and contracts - possible changes also to e-procurement warranted
- Changes in purchasing law to increase threshold for letting at the DOH division level
- Legislation to pass on costs incurred when utility companies' conflicts result in project delays
- Legislative changes to New Starts funding criteria

Next Steps

- February – Present recommendations to LT for final approval of new workstreams
- Assemble teams for approved workstreams
- Send memoranda to BU managers to implement Internal Efficiencies
- Track timetables and conclusions
- Compile all results in a final report for submittal LT by March 31

Comments and Questions?

Uncertainties — action items in RED

- How to move forward on areas where we are unsure? Example - if training is across two units, Construction and Geotechnical, how do we know this is not a duplication of effort? – **Take no action**
- Is Bike & Ped move back to Roberto already underway? -- **Recommend IE** (Memo to Susan from RC')
- Will the bigger question of how the non-hwy modes & TPB interact come under the *Transportation Planning Workstream* issue? – **Forward to Transportation Planning/Programming Workstream**
- **Contract Office** – wants to qualify prime contractors, an activity currently performed by Construction Unit. Is there any value in doing this? -- **Take no action**
- **CEI Recommendation from Ellis**. Is this a discussion between two affected parties or what? -- **Forward to PPD Workstream**
- **Communications Office recommendations** - metrics, more customer service and support oriented? – **Memo to LT from RC**
- Need for a stand-alone **Office of Procurement** or improved procurement practices via training?– **Forward to PPD Workstream**
- How to make TESS Branch more lean and mean by pushing some duties to the division or other branches and direct its focus statewide issues – **Memo to Chief from RC**
- Municipal/School Transportation Engineer should be responsible for Safe Routes to School Coordination? – **Memo to LT from RC**
- **Facilitation assistance** for Ferry and others - Order of delegated responsibility TMT, OEQ, Productivity **Services...Set up meeting with Ferry Division**
- **3R program** – relationship with what is done here and what ADU is doing? What level of coordination exists for this effort. How far do we go to be green? Is this a cultural change belonging in Office of Change Management or it is a PPD? Where does this belong? – **Memo to John Sharp from RC...come up with game plan to elevate 3R**
- How do we respond to BUs where no significant findings were discovered? How do we close that loop? – **List all BUs with no significant issues and follow up Memo to LT for RC??**
- **R&D** – **forward to Transpo Planning Workstream**
- **What happens next?** Are these recommendations to be translated into a revised organization chart?

Deep Dive Candidate_ take no action

- Hydraulics & Natural Environment Units
 - Recommendation to relocate Natural Environment Unit to Century Center and establish it as a new unit in the Design Branch
 - 3rd party facilitation between Hydraulics and NEU

Deep Dive Candidate_ forward to PPD

- Office of Environmental Quality/Productivity Services (Change Management)
 - Skill-set required to assume duties and responsibilities of TMT once it is dissolved
 - Proposed organizational location: Human Resources
 - Dashed line relationship with SPOT

Deep Dive Candidate_ forward to TP Workstream

- Research & Development
 - R&D functionality spread across several divisions
 - Primarily R&D grants administration housed in Transportation Planning
 - Other R&D opportunities under Materials & Test
 - Long-term possibility - locate this functionality in SPOT

Deep Dive Candidate_ set up mtg w/ Angela Faulk

- DMV - License & Theft - Emissions
 - Recent publicity citing overstaffing for current workload
- DMV - Administration
 - Human Resources functionality redundant with Department Human Resources functionality
 - Seems to be in opposition to ONE North Carolina philosophy

Deep Dive Candidate_ ask Mark T for Office of Biz Intelligence definition and then take no action or forward

- Office of Business Intelligence (waiting for TG to verify and follow-up)
 - Linking databases and data systems together (e.g., MMS, PMS, BMS, etc.)
 - Real-time application of asset management principles

Deep Dive Candidate_ forward to Joey

- Board of Transportation
 - Shift focus to strategic issues
 - Reduction of the number of redundant approvals
 - Adjustment of meeting frequency

Deep Dive Candidate_ Memo to LT from RC

- Communications Office
 - Determine viability of recommendations from Communications Office for additional duties
 - Customer-focus driven
 - Possible name change to reflect current end products and functionality: Public Affairs Office, Public Information Office, or Public Relations Office

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRANSFORMATION MANAGEMENT TEAM

BUSINESS UNIT EFFICIENCY WORKSTREAM: ADA FUNCTIONALITY

ANALYSIS & RECOMMENDATION
OCTOBER, 2008

Table of Contents

ISSUE TO BE REVIEWED (HYPOTHESIS).....	3
RESEARCH AND FINDINGS.....	3
RECOMMENDATIONS	3

ISSUE TO BE REVIEWED (HYPOTHESIS)

The results of the Business Unit Efficiency Survey indicated that the ADA program administration was fragmented across several business units including: Alternative Delivery Unit, Office of Civil Rights & Business Development, Human Resources, Productivity Services, General Services, and others, there appears to be no definitive policy or procedures for complaint filing and corrective action, and potential legal ramifications require formalized process

RESEARCH AND FINDINGS

In the Business Unit Efficiency Workstream, Safety ADA functionality was identified as a “deep dive” candidate because of the issues identified in the hypothesis. A work group was created with the following membership:

Name	Division/Branch/Unit/Section
Philip Bickham	Human Resources Division
Jeff Cox	Bicycle & Pedestrian Division
Joseph Ishak	Work Zone Safety
Tim Luckwaldt	Aviation
Miriam Perry, Director	Public Transportation
Jimmy Travis	Alternative Delivery Unit
Anthony Roper, Deputy Secretary (Ad Hoc/Advisory)	Administration & Business Development

The workstream methodology included:

- Discussed research findings
 - Interviews with stakeholders (Alternative Delivery Unit, Aviation, Bicycle & Pedestrian, Ferry, Office of Civil Rights & Business Development, Productivity Services, Public Transportation, Rail, and Work Zone Safety)
 - Literature research (Americans with Disabilities Act, Title VI, NCDOT website, *Title VI Nondiscrimination in the Federal-Aid Highway Program* and *Access for Individuals with Disabilities under Section 504 of the Rehabilitation Act and Title II of the ADA*)
- Reviewed Regulations
- Summarized findings
- Identified gaps
- Developed initial recommendations
- Finalized recommendations

RECOMMENDATIONS

Based on the findings from an initial survey, interviews with stakeholders, and literature research conducted, several recommendations were proposed. The recommendations provide an opportunity to streamline the process including improving response time and record keeping.

- **Post a Letter of Position authored by the Secretary.** This letter would articulate the Department’s commitment to ADA and possibly satisfy the immediate compliance need for an ADA policy statement as noted in the results of the FHWA baseline assessment report.

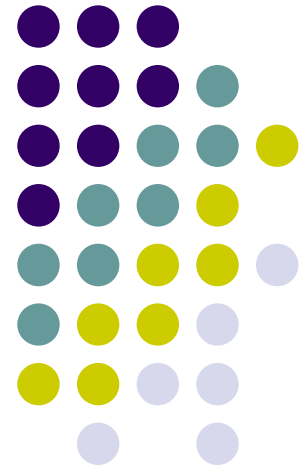
- **Establish an ADA Oversight Committee.** The committee would be composed of stakeholders. The goals of the committee would be to coordinate with other stakeholders including those external to the agency (e.g., FTA, FRA, FAA, FHWA, State Construction Office, Department of Insurance, etc.), information sharing, and imbue ADA awareness within the departmental culture. The committee's functions would include:
 - Review of current regulations, frequent briefings from similar programs, trends analysis, and funding requests,
 - Develop recommendations of policies and procedures, and training,
 - Define requests and complaints for reasonable accommodation,
 - Define threshold for tracking, and
 - Develop compliance auditing process. (Update existing transition plan utilizing FHWA baseline assessment as the datum.) This activity would be an immediate action item.
- **Modify the Current ADA Training.** Revamp internal ADA training course and other courses with correlated topics. Review ADA training provided to our grantees/sub-recipients and external customers taught by DOT and others.
- **Create a Single Point of Contact for Discrimination & Accommodation.** This position would streamline and simplify current process, and create synergy. In addition, the SPOC would act as a clearinghouse for all complaints, issues, questions, and requests (e.g., Titles VI and VII, ADA, discrimination, accommodation, etc.) All complaints would be tracked by the SPOC and assigned accordingly and appropriately. This recommendation would ensure the continuity of all training, printed materials, website policies, procedures, and other public and private forms of communication.

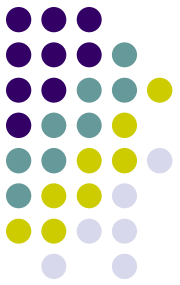
The Leadership Team accepted our recommendations with the following caveats:

- Since a statewide ADA coordination has been appointed by the Governor, we need to seek audience with this individual and share with him/her the results of the FHWA baseline assessment and the Department's plan for this functionality.
- Develop a timeline and prioritization of initiatives identified in our presentation.
- Discuss with Mark Foster the tool used by the State Employees Credit Unit. He described the tool as a universal help line that also tracks complaints.
- Include representation from FHWA on the oversight committee and determine if FHWA is the lead agency representing FRA, FTA, FAA, and other federal agencies in the administration of ADA.
- Determine if and when a response is due to FHWA concerning the findings of the FHWA baseline assessment.

ADA Workstream

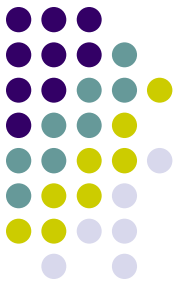
LT Presentation
July 29, 2008





Work Group Members

- Philip Bickham – Human Resources
- Jeff Cox – Bicycle & Pedestrian
- Joseph Ishak – Work Zone Safety
- Sharon Lipscomb – OCR
- Tim Luckwaldt - Aviation
- Miriam Perry – Public Transportation
- Walt Thompson – Productivity Services
- Jimmy Travis – Alternative Delivery Unit
- Anthony Roper – Ad Hoc/Advisory



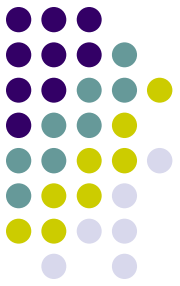
Workstream Hypothesis

- ADA Functionality
 - Fragmented program administration across Alternative Delivery Unit, Office of Civil Rights & Business Development, Human Resources, Productivity Services, General Services, and other BUs
 - No definitive policy or procedures for complaint filing and corrective action
 - Potential legal ramifications require formalized process



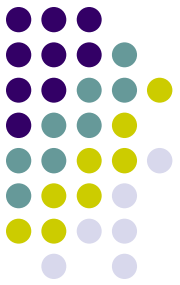
Workstream Methodology

- Discussed research findings
 - Interviews with stakeholders
 - Literature research
- Summarized findings
- Identified gaps
- Developed initial recommendations
- Finalized recommendations



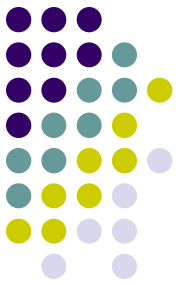
Final Recommendations

- Post a Letter of Position authored by the Secretary
- Establish an ADA Oversight Committee
- Modify Current ADA Training
- Create a Single Point of Contact for Discrimination & Accommodation



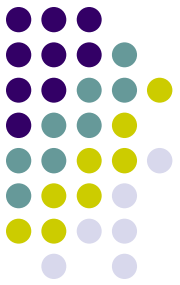
Final Recommendations

- **Post a Letter of Position Authored by the Secretary**
 - Articulates the Department's commitment to ADA
 - Satisfies the immediate compliance need for an ADA policy statement as noted in the results of the FHWA baseline assessment report



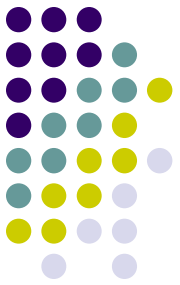
Final Recommendations

- **Establish an ADA Oversight Committee**
 - Composed of stakeholders
 - Initial ADA Oversight Committee composed of Work Group members
 - Representation from the following business units:
 - Office of Civil Rights/Equal Employment Opportunity
 - Alternative Delivery Unit
 - General Services
 - Public Transportation
 - Rail & Aviation (Alternating terms)
 - Communications
 - Division of Motor Vehicles
 - Preconstruction
 - Operations
 - Bicycle & Pedestrian
 - Attorney General – Ad Hoc/Advisory



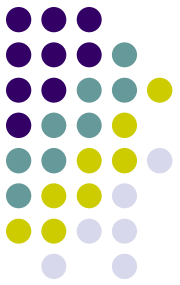
Final Recommendations

- **Establish an ADA Oversight Committee - continued**
 - Goals: Coordination with other stakeholders including external stakeholders (e.g., FTA, FRA, FAA, FHWA, State Construction Office, Department of Insurance, etc.), information sharing, and imbue ADA awareness within the departmental culture
 - Functions include:
 - review of current regulations, frequent briefings from similar programs, trends analysis and funding requests,



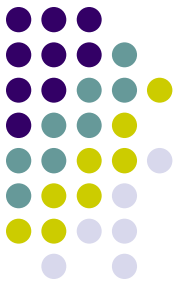
Final Recommendations

- **Establish an ADA Oversight Committee – continued**
 - Functions *continued*:
 - develop recommendations of policies and procedures, and training,
 - define requests and complaints for reasonable accommodations,
 - define threshold for tracking, and
 - develop compliance auditing process (Update existing transition plan utilizing FHWA baseline assessment as datum) - Immediate action item.



Final Recommendations

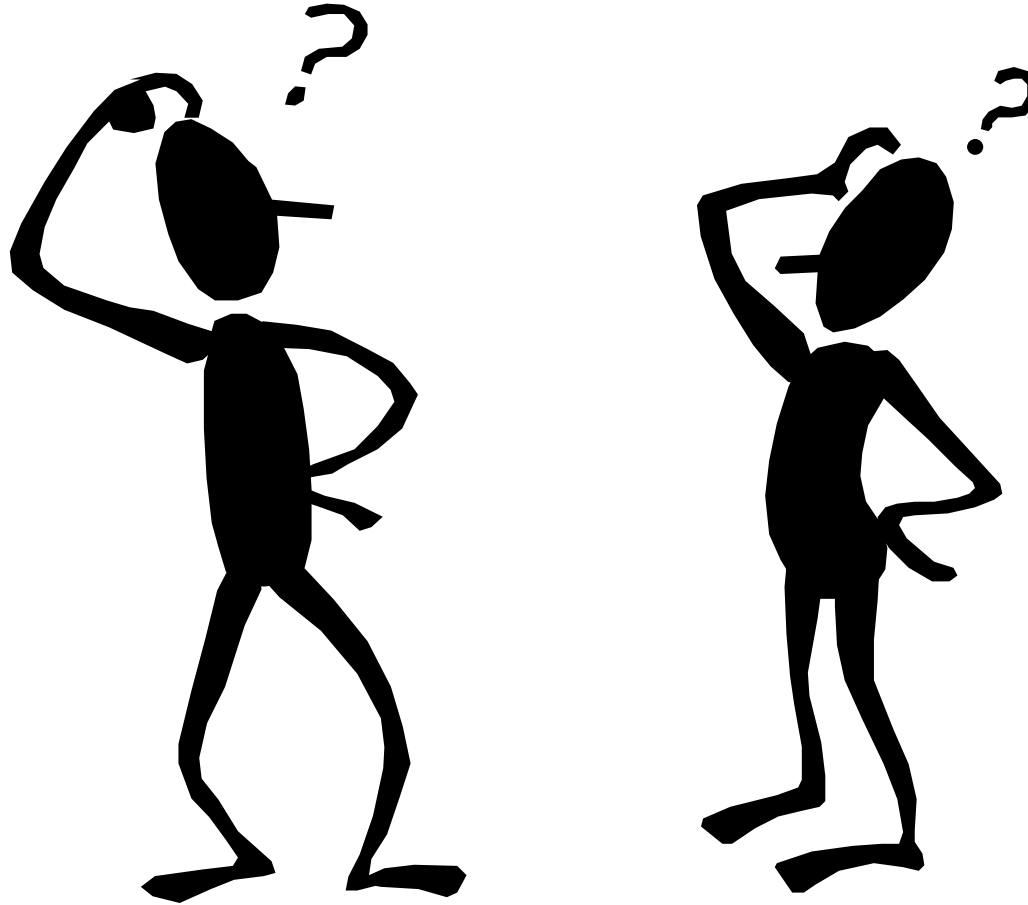
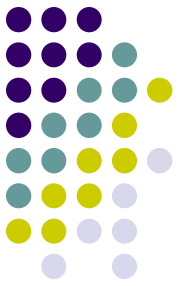
- **Modify Current ADA Training**
 - Revamp internal ADA training course and other courses with correlated topics
 - Review ADA training provided to our grantees/sub-recipients and external customers taught by DOT or by others



Final Recommendations

- **Create a Single Point of Contact for Discrimination & Accommodation**
 - Streamlines and simplifies current process, and creates synergy
 - Acts as a clearinghouse for all complaints, issues, questions, and requests (e.g., Title VI, Title VII, ADA, discrimination, accommodation, etc.)
 - All complaints tracked by SPOC
 - Complaints assigned accordingly and appropriately
 - Ensures the continuity of all training, printed materials, website, policies, procedures and other public and private forms of communication
 - Utilization of the current 1-800-DOT4YOU Customer Service System

Questions and Comments



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRANSFORMATION MANAGEMENT TEAM

BUSINESS UNIT EFFICIENCY WORKSTREAM: DIVISION OF SAFETY & RISK ASSESSMENT

ANALYSIS & RECOMMENDATION
OCTOBER, 2008

Table of Contents

ISSUE TO BE REVIEWED (HYPOTHESIS).....	3
RESEARCH AND FINDINGS.....	3
RECOMMENDATIONS	4

ISSUE TO BE REVIEWED (HYPOTHESIS)

To gain a better understanding of the role and responsibilities of the Safety & Loss Control Unit and Management Assessment Unit, and identify streamlining opportunities. The structural, functional, and management opportunities for improvement were reviewed.

RESEARCH AND FINDINGS

In the Business Unit Efficiency Workstream, Safety & Loss Control and Management Assessment Units were identified as “deep dive” candidates because of the natural linkages that existed between the two units. A work group was created with the following membership:

Name	Division/Branch/Unit/Section
Bob Andrews, Director	Safety & Loss Control Unit, Division of Highways
Mickey Brock, Director	Management Assessment Unit
Jeannie Bailey	Security Unit, Management Assessment
Anthony Roper, P.E., Deputy Secretary (ad hoc)	Administration & Business Development

In addition to information extracted from the responses provided in the Business Unit Efficiency Surveys, research data was obtained from interviews with staff from the Safety & Loss Control (Bob Andrews and Larry Purvis) and Management Assessment (Mickey Brock and Jeannie Bailey) Units. Additional information was obtained from job descriptions of Security Managers from private industry using *Monster.com*.

The key findings noted between the units were:

- Natural Linkages
 - Safety risk/evaluation for people and property
 - Quality control: prevent loss of life and injury.
 - Emergency Management
 - Compliance/coordination of Homeland Security Act
 - Preparedness and education of employees
 - Statewide Responsibilities
 - Safety & Loss Control Unit currently under the Division of Highways, but acts as “safety consultant” to the entire Department
 - Security Unit under Management Assessment is responsible for all DOT facilities in 100 counties.
- Measuring effectiveness/compliance
 - More routine feedback mechanisms are needed for training and services
 - Currently, no formal performance review of surveillance vendors and contractors, or security contractors
 - Inability to associate expenditures and identify return on investment (ROI)
- Employee awareness and education
 - Improve clarity of the roles/responsibilities of both units and who serves as point of contact for crisis situations
 - Improve opportunities for emphasizing vigilance and safety threat awareness among rank and file

- Should start when DOT onboards new employees and continues throughout employees' tenure

RECOMMENDATIONS

Based on the findings from an initial survey, follow up interviews, and research conducted, several recommendations were proposed. The recommendations provide an opportunity to improve the delivery, coordination, and overall management of current services provided by these respective units.

- **Bring the role/responsibilities of the current Security and Safety and Loss Units under one Division.** This Division would report directly to the Deputy Secretary of Administration and Business Development. The name would be modified to better reflect the services provided, and emphasizes the Department's commitment in providing its employees with a safe and secure working environment and protecting its physical assets (currently limited to facilities, but moving towards all physical assets). Suggested name titles include: Division of Safety & Security, Division of Risk Assessment, Division of Risk Management, Division of Loss Prevention, and the Division of Incident Prevention. As initial action items, staff members in this Division should consider preparing:
 - New mission statement and service goals;
 - Adjusted performance metrics (with the help of Performance Metrics team in TMT);
 - Potential role/responsibility changes for particular positions (or long term development of new positions) based on this move to one Division; and
 - Action plans for short-term and long-term goals.
- **Upgrade the position classification and visibility of the current head of Security and reorganize this functionality to a whole section under the newly-formed Division.**
 - This position currently handles:
 - routine security and handling of safety threats for facilities in all 100 counties for NCDOT;
 - special requests to escort employees (after hours, for terminations, etc);
 - oversight of security service providers and equipment (Tech Systems and Weiser Security); and
 - oversight of property guard and State Capitol Police.
 - The current position requires reallocation. Human Resources suggested the position of Administrative Officer II as the best option. The Administrative Officer classification offers the most flexibility in allowing modification of the job description with an attractive salary. The tentative title for the position is Security Manager and examples of similar positions within the public section were researched for minimum educational requirements and knowledge, skills, and abilities. Initial discussions concerning the position description verbiage and other sections of the PD-102R-92 reviewed with Human Resources.
- **Improve and increase the evaluation and effectiveness of Tech Systems and Weiser Security.** These contracted services need further review (quarterly or additional customer feedback forums) to properly evaluate if NCDOT is getting a strong return on investment. A visible set of metrics and performance criteria is recommended to address this issue.
- **Consider additional role, responsibilities and training to support Homeland Security measures and requirements for State Agencies.** A thorough evaluation of the risk preparedness of NCDOT is recommended in light of the vulnerability of the state's transportation system. This work is best suited to be completed by this Division. This will be included in the newly reallocated role of Security Manager.

Below is a brief summary of notes from the work group sessions:

1. “Synergy Affect”
 - a. Elevate the importance of Safety Loss & Control/Management Assessment (Security) service to ALL areas/modes of NCDOT (not just DOH). *One DOT idea.*
 - b. Improved communication/coordination is required to achieve a higher level of safety and quality control for the entire Department
 - c. Preservation of our facilities (physical plant) and our people (employees/visitors) should be a shared vision and is better accomplished through a collaborative effort
2. “Elevate Security” – through the creation of a standalone unit dedicated to Security Operations
3. “ROI”& “Identifying the Gaps”
 - a. Combined unit can prepare business case, budgetary needs, annual evaluation of 1) where DOT is today (baseline level of service (LOS)) and 2) where the DOT should be (future LOS target).
 - b. Thorough evaluation of surveillance systems and security support currently provided. Is this the best way to handle security/monitoring our buildings and people?
4. “DOT preparedness for 21st Century Threats”
 - a. Addressing Homeland Security measures
 - b. Addressing any other federal requirements from FTA, FHWA, FRA, etc.
 - c. Addressing any proposed state legislation
 - d. Natural disasters, terrorist acts, vandalism, coordination with state/local law enforcement

Business Unit Efficiency Assessment Safety & Loss Control and Management Assessment

Presentation to LT Workstream Findings & Recommendations

June 10, 2008

Priscilla Tyree

Alpesh Patel

Bob Andrews

Jeannie Bailey

Mickey Brock

Anthony Roper

Workstream Group Members

- Bob Andrews – Safety & Loss Control Unit
- Jeannie Bailey – Management Assessment
- Mickey Brock – Management Assessment
- Anthony Roper – Deputy Secretary,
Administration & Business Development

Today's Objectives

- Background
- Review Workstream Hypothesis
- Review “Key” findings/issues
 - Interviews and Research
- Present Draft Recommendations
- Obtain approval to proceed

Background

- Conducted Department-wide “Bottoms Up” evaluation – November 2007 to January 2008
- Findings categorized under 4 study areas (February 2008):
 - “Deep Dive” Workstreams
 - Internal Efficiencies
 - Training Opportunities
 - Procedural Changes
- *Safety & Loss Control and Management Assessment* identified as 1 of 3 Deep Dive workstreams

Hypothesis

- *“Gain a better understanding of the role and responsibilities of these two BUs and identify streamlining opportunities”*
 - Review structural, functional, and management opportunities for improvement
- Are current services effective? Can improvements be achieved and efficiencies gained by staying independent or by merging units?

Hypothesis con't

- Lack of quantifiable data:
 - Total \$\$ spent on security
 - What investment level is necessary to attain acceptable LOS?
 - ROI for security measures?
- Workstream driven by:
 - customer perspective and delivery of services

Key Findings

(from Interviews/Research)

■ *Natural Linkages* exist between Units

■ Safety risk/evaluation for people and property

- *Prevent* loss of life and injury; *Provide* quality control

■ Emergency management

- Compliance/coordination of Homeland Security Act
- Preparedness and education of employees

■ Statewide responsibilities

- Safety & Loss Control under DOH but acts as “safety consultants” to entire DOT
- Security, housed in Management Assessment, is responsible for all DOT facilities in 100 counties

Key Findings

(from Interviews/Research)

- Measuring effectiveness/compliance
 - More routine feedback mechanisms are needed for training and services
 - Currently, no formal performance review of surveillance vendors/contractors or security contractors
 - Multi-year contracts with annual renewal options
 - Inability to associate expenditures and identify ROI

Key Findings

(from Interviews/Research)

- **Employee awareness and education**
 - Improve clarity of the roles/responsibilities of both units; who serves as point of contact for crisis situations
 - Improve opportunities for emphasizing vigilance and safety threat awareness among rank and file
 - Should start when DOT onboards new employees and continues throughout employees' tenure

Recommendations

- Bring Safety & Loss Control and Management Assessment under a new Division
 - Reports to Dep. Secretary, Administration & Business Development

“Synergy Affect”

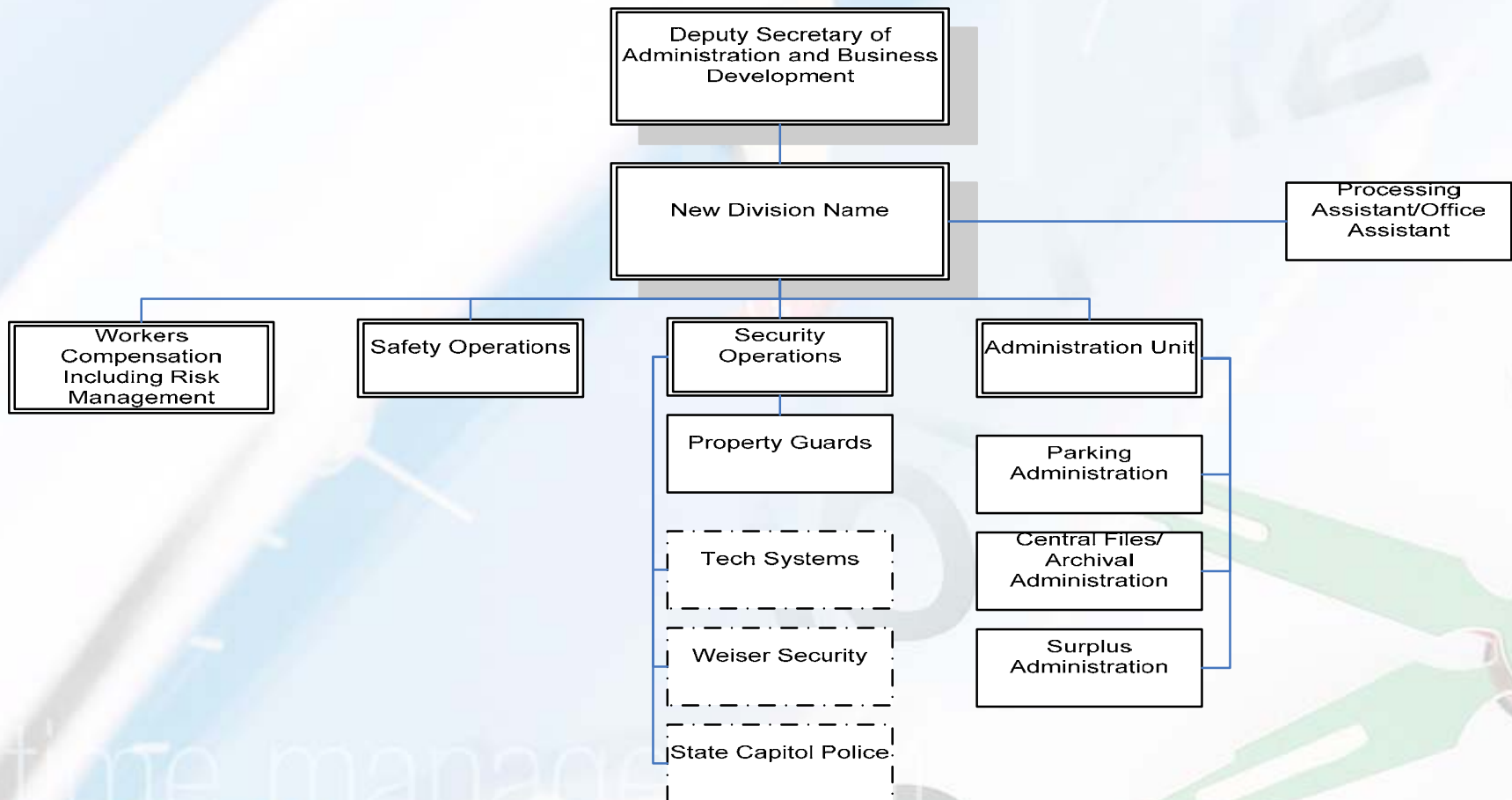
- Elevates the importance of Safety & Loss Control/Management Assessment services to ALL areas and modes of the Department, not just the DOH.
- Improves communication and coordination to achieve a higher level of safety and quality control for the entire Department.
- Reinforces a shared vision – preservation of our facilities (physical plant) and our people (employees and visitors) is better accomplished through a collaborative effort.
- Three primary units: Safety Operations, Security Operations, and Workers' Compensation.

Suggested Division Names

- Safety & Security
- Risk Assessment
- Risk Management
- Incident Prevention
- Loss Prevention

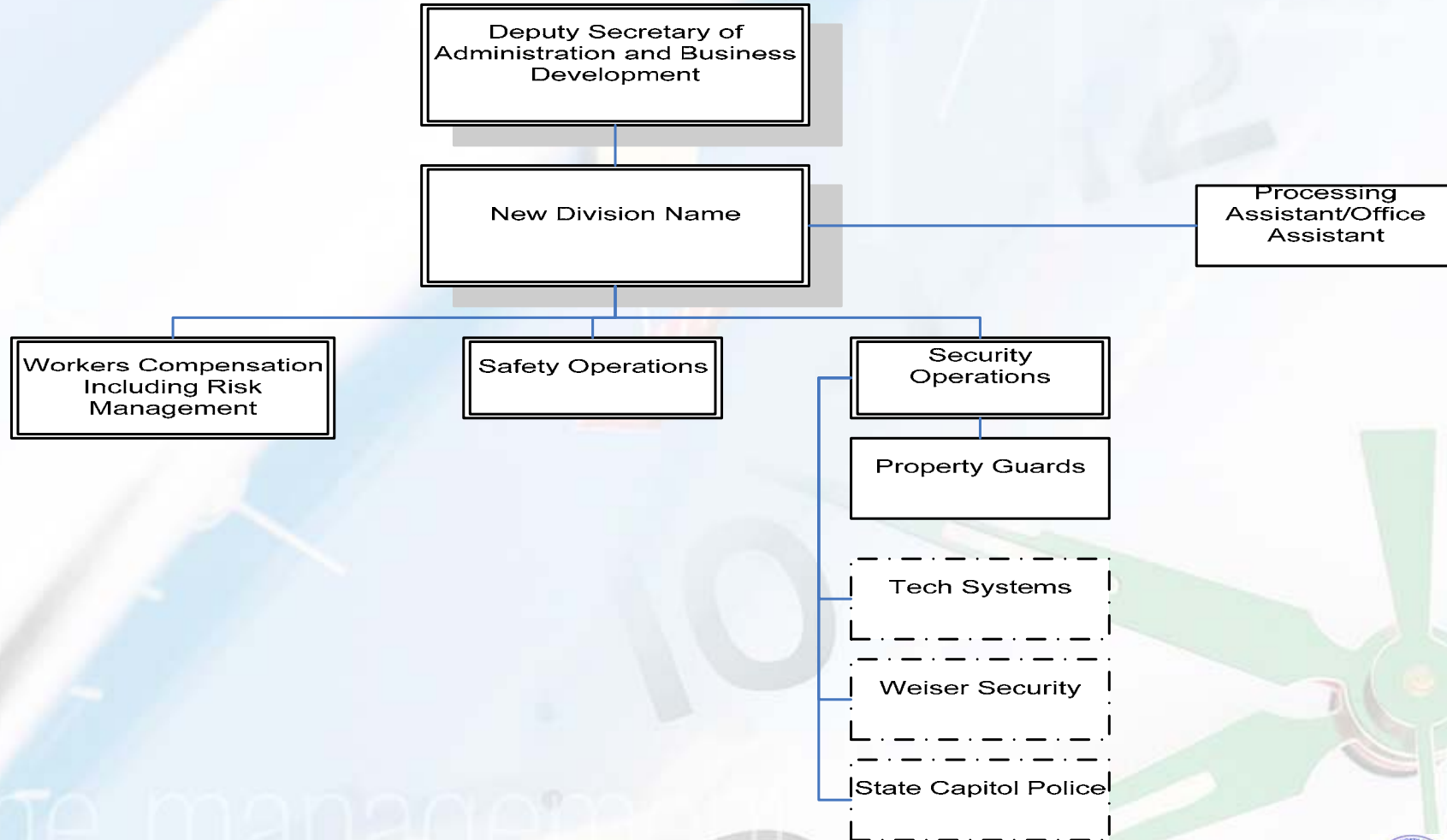
Recommendations

Proposed Organizational Chart – Version 2



Recommendations

Proposed Organizational Chart – Version 3



Recommendations

■ **Move Parking Administration**

- Consider it a benefit (EVP) and move it to HR or
- Consider it an employee service and move it to General Services

■ **Move Central Files and Archives Administration to owner**

- Files belong to Construction Unit, place file management with the owner

■ **Move Surplus Administration**

- General Services currently manages the Swap Shop and Facilities Maintenance arranges for the transportation of items
- Make owner responsible for administrative functions

Recommendations

- Create a stand-alone **Security Operations Unit** (under this new Division)
 - Opportunity to grow security services and further leverage technology solutions for DOT
 - Opportunity for legacy planning and knowledge transfer
 - Improved visibility is commensurate with level of responsibility and more aligned with similar offices in public/private industry
- Make **Safety Operations** a stand-alone unit
- Collapse **Risk Management into Workers' Compensation** and create one stand-alone unit

Recommendations

- Determine **ROI** and Identify **Gaps**
 - Combined BUs should prepare new mission statement with appropriate goals/metrics
 - Combined BUs should prepare a “Baseline of Service Effectiveness” and an **Action Plan** to improve current services
 - **“Baseline”** should include (but not limited to):
 - surveillance systems, security services and systems, SPPs/SOPs, competency evaluations, effectiveness of current training, etc.
 - **Action Plan** should include (but not limited to):
 - Budgetary, technology, staffing, and training resources required to “move the performance needle” in the future

Recommendations

- **Prepare a 21st Century Threat Preparedness Plan**
 - DOT's current readiness in light of post-911 world
 - Transportation system vulnerability and asset protection
 - How is DOT addressing
 - Homeland security measures?
 - Federal requirements (FTA, FHWA, FRA, etc.)?
 - New or past state and local legislation?
 - Steps required to handle natural disasters, terrorist acts, vandalism, coordination with state/local law enforcement?
 - Plan provides an opportunity to formally house DOT's strategies in one document (web ready and updatable)
 - Cross training of security and safety personnel (Safety Officers, Safety Engineers, Facilities Managers, etc.)

Comments and Questions?



NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION
TRANSFORMATION MANAGEMENT TEAM

DRAFT FINAL

TRAFFIC COUNTS/
TRAFFIC DATA MANAGEMENT
ASSESSMENT

EVALUATION & RECOMMENDATIONS

ALPESH PATEL
MEREDITH MCDIARMID, PE
WILL BEATTY (FHWA)
SEPTEMBER, 2008

Table of Contents

ISSUE TO BE REVIEWED (HYPOTHESIS).....	3
RESEARCH AND FINDINGS.....	4
RECOMMENDATIONS.....	12
SUMMARY OF WORKSHOP RESULTS.....	19
APPENDIX.....	20
FHWA MEMO.....	
STAKEHOLDER INTERVIEWS.....	
DIVISION SURVEY RESPONSES.....	
RESEARCH AND NATIONAL BEST PRACTICE.....	

ISSUE TO BE REVIEWED (HYPOTHESIS)

To identify a more strategic approach to managing traffic data and count collection services statewide. Analysis includes:

- Improved collaboration of various BU's that either produce or need traffic data. Consideration of a plan to govern long term decision making on the placement, use, collection & dissemination of traffic data
- Use of technology to stream information in real time to internal and external customers. Storage and maintenance of traffic data in a single database with mapping interface.
- Shared use and communication capabilities of traffic data collection equipment.

RESEARCH AND FINDINGS

RESEARCH

The four month approach to pursue the workstream hypothesis included background research (literature and national best practice), one-on-one interviews with key stakeholders, discussions with national traffic experts, solicitation of improvement ideas through a field division survey, field trips to gather data and understand the management of municipal traffic systems, review of federal guidelines regarding traffic monitoring systems, and research on technological advances by 3rd party traffic data providers and the systems that support such information flow. Emphasis was placed on obtaining the perspective of both the units that collect traffic data and those units that “consume” traffic data (directly or indirectly) to make planning, engineering, safety, design, and operational decisions. Interviewees were asked how traffic data is collected, stored, shared, and reported and how the overall process of managing traffic count data (from a functional, technical, and communication perspective) could be improved. Specific groups and items covered included:

- **Stakeholder Interviews**
 - Transportation Planning Branch – specifically the Traffic Survey Group and Traffic Forecasting staff
 - Traffic Engineering & Safety System Branch (now Mobility and Safety Division) – specifically the Traffic Safety Unit
 - Intelligent Transportation System – specifically the Systems & Operations Units
 - Work Zone Traffic Control
 - Geographic Information Systems
 - Rail Division – specifically Engineering and Safety Branch
- **Survey to all 14 Transportation Field Divisions**
- **Field Trips to Division 6 and Cities of Raleigh and Fayetteville**
 - Review of Division count equipment and municipal management of traffic signal systems
- **Quarterly Roundtable with Regional and Division Traffic Engineers**
- **National Best Practice Research**
 - Iowa, Illinois, Georgia, Florida, New York, Wisconsin, South Carolina
- **Resources referred to:**
 - FHWA Traffic Monitoring Guide
 - Traffic Monitoring System (Dec 03)
 - AASHTO guidelines
 - Articles on Traffic Flow technology
 - Transportation Planning Branch Director (Mike Bruff) PMP paper (1999)

FINDINGS

A variety of business units in NCDOT have a role in helping to collect, analyze, store, and disseminate traffic count data to internal and external customers. Consequently, business units internal to NCDOT and outside customers also have an interest in “consuming” this information for making a variety of decisions ranging from projects to land speculation by developers to pure interest of traffic volumes by a citizen. Below is a short synopsis of the key NCDOT units involved in collecting count data and their respective roles and responsibilities in the process.

- **The Traffic Survey Group (TSG)** within the Transportation Planning Branch (TPB) is the primary traffic data provider for NCDOT. This group provides statewide coverage (79,000 miles) of quality traffic data to support the planning, design, construction, maintenance, operation, and research activities required to manage the transportation system in North Carolina. Per Federal Highway Administration (FHWA) guidelines TSG organizes traffic monitoring activities under the following three programs **(insert TSG’s yearly budget here)**:
 - **Coverage Count Program** - This program consists of statewide coverage of short-term (48-hour) Portable Traffic Counts (PTC). There are approximately 40,000 PTC monitoring stations located throughout the state. Data is collected on both state and locally maintained roadways throughout the state. These counts are factored into Annual Average Daily Traffic (AADT) volumes using seasonal and classification data from other TSG programs. **Insert website**
 - **Continuous Count Program** - This program consists of permanent traffic monitoring stations that are used to collect traffic data 24 hours a day and 365 days a year on a sample of roadways throughout the state. The data collected at these stations is used to generate seasonal factors for the Coverage Count Program and are reported to the FHWA for trend analyses, Highway Performance Management System (HPMS) reporting, cost allocation reporting and support of pavement design research and project planning studies. Traffic equipment that supports this program includes Weigh in Motion (WIM) (45 stations at 60 sites) and Automated Traffic Recorders (ATRs). There are 80 such ATRs statewide.
 - **Projects Count Program** - Project Counts range in magnitude from a simple bridge replacement to a very complex regional transportation model and is scheduled in coordination with the customer. Traffic data is requested to support a variety of planning and engineering studies and provides traffic count services for traffic forecasting, research projects, area transportation planning studies, and work zone design studies. The data collected may include hourly volume, hourly vehicle class, manual class, and turning movement data. In addition, special projects are sometimes designed to suite the customer’s data need.
- Other units who have an important but smaller role in count collection include:
- **The Traffic Safety Unit (TSU)**, within the Traffic Engineering and Safety Systems Branch (TESSB), uses electronic and hard (paper) copies of turning movement

counts (including truck and pedestrian movements) for traffic engineering safety and operational analyses. Roughly 80% of the counts are for traffic signal evaluations (installation, removal, timing, phasing, etc.) based on signal warrant analyses in accordance with Manual on Uniform Traffic Control Devices (MUTCD) signal warrants. This information is ultimately used to determine roadway improvements to increase the safety and operational capacity of roads on the State Highway System (SHS) through Transportation Improvement Program (TIP), hazard elimination, and spot safety projects.

- TSU exclusively relies on six (currently) Professional Engineering Firms (PEF's) to collect 16 hour turning movements. TSU spends just over \$500,000 per year to manage these firms. TSU restructured their RPF process 2 years ago to find firms which could meet a 2 week turnaround time. TSG had previously been asked to provide such turning move counts but could not provide them in the timeframe needed due to staffing and resource shortages. TSU stores all of their counts within an internal database but is migrating all their turning move info and traffic impact analysis data directly to their website: <http://www.ncdot.org/doh/preconstruct/traffic/safety/TSI/>
- **Division Traffic Engineers** and their technical staff in the 14 field Division Offices use a variety of portable count equipment to handle traffic safety and operational improvement requests which are primarily from citizens and local governments. Examples of such requests (and other internal or project related needs for collecting counts) include:
 - speed study investigations
 - signal phasing changes (example, need for protected left turn movements)
 - signal warrant investigations and four-way stop control decisions
 - counts for potential work zones lane restrictions
 - gathering Average Daily Traffic (ADT) and truck percentages for pavement design decisions
 - gathering counts for needed roadway improvements due to new development
 - verification of AADT for commercial driveway permits
 - counts for rating unpaved secondary roads
 - counts to support design data for roadway/intersection projects by Division Design and Construct (DDC) units
 - The portable count equipment used to collect such traffic data includes:
 - Nu-Metric Hi Star devices, JAMAR turning movement counter, and tube counters.

Data gathered for these studies resides within the Division where it is collected. For 16-hour turn movements and counts needed for complex intersection analysis (multiple thru lanes, dual lefts and right turn lanes), Division staff routes their requests through TSU who in turn call upon their PEF's to collect the data.

Insert annual amount (on average) Divisions are spending to collect counts

- **The Rail Division is responsible for collecting counts at public and select private at grade** railroad crossings across NC. Count data within the rail crossing safety program (transferred to Rail Division from TESSB in November of 1998) goes back to 1974. Data itself is stored in an internal Statewide Authoritative Rail and

Highway (referred to as SARAH) database which staff has been steadily updating so that all “public” crossings have counts that are 5 years old or less. Current crossing inventory responsibilities are managed by three staff in Rail’s Engineering and Safety section who utilize two PEF’s to collect 24 hour tube counts. Approximately \$120,000 is expended annually to manage this count program. **The actual count collection responsibility is only 1-2% of staff time**, mostly involving task management and QA/QC. Counts are also requested for special studies and projects (such as traffic separation studies, grade crossing closure evaluations, etc.) This data is not available on Rail’s website but can be extracted and delivered electronically to any requesting unit. Current database of statewide crossings, including traffic counts at public at-grade crossings, include:

- 4100 public at grade rail crossings
- 3100 known private railroad crossings
- 800 grade separation locations

800 counts have been collected so far in 2008

- **The Regional Transportation Management Centers (TMCs)** use Road Traffic Microwave Sensors (RTMS) devices to collect both travel speed and traffic volumes to measure congestion conditions on NC’s Interstates. Currently the devices provide coverage of 50 miles of Interstate in Charlotte and the Triangle. In the near future this coverage will expand to other areas and cover over 142 miles of Interstate.
Annual budget?

GENERAL FINDINGS

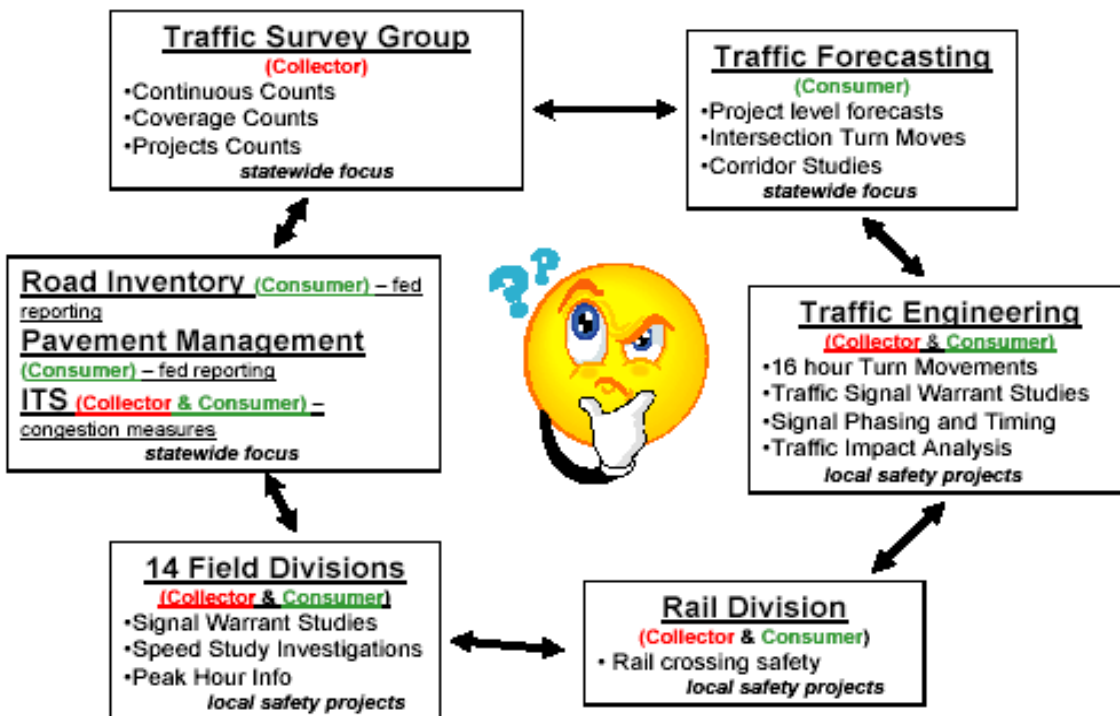
1. **Timely delivery of traffic counts is a key factor in the critical path for timely delivery of TIP projects and prioritizing safety needs.**
- The collection, analysis and delivery of traffic count data is a key data component that supports fundamental planning, project development, design, operational, and safety decisions. Delays in receiving count data have a ripple effect in the overall movement and maturity of a project. Count data is essential for developing project level forecasts which in turn influence cross-section design decisions, pavement thicknesses, intersection design changes, and ultimately the resulting cost and scope of a project.
- Traffic count data is also a critical data element in:
 - Developing travel demand models and air quality conformity analysis
 - Producing NCDOT’s yearly Annual Average Daily Traffic (AADT) books
 - Advancing research projects (TSG collected 470 truck counts in 2006 for a freight research study)
 - Supporting federal requirements such as:
 - sample data for Highway Performance Monitoring System (HPMS)
 - vehicle classification
 - Driving Rail Division’s Investigative Index Model – This model quantitatively determines the most at risk grade crossings which in turn help Rail staff determine how to prioritize projects and make programming/funding recommendations. The accuracy, quality and quick turnaround time for the count data has a direct impact on what crossings can be addressed in a given

budgetary cycle and what other engineering resources are needed to expedite the safety solutions.

- 14 Division Offices' ability to prioritize and determine if a segment of highway or intersection requires further engineering resources and how the Department will respond to critical (and in some cases controversial) local safety issues (such as lowering speed limits or installing signals where none exist currently).
- The quality and accurate reporting of traffic data through NCDOT's traffic monitoring systems has a direct impact on the size of federal apportionment dollars that come back to NC.
- Traffic forecasting units (currently seven staff in TPB) are NCDOT's primary providers for or reviewers of project level traffic forecasts. For almost every forecast there is a need for traffic count information.
- Input from both traffic forecasting staff and the customers which receive these project level forecasts indicate:
 - Little to no advanced warning of when the next forecast request is coming
 - Inability to even out the fluctuations in receiving and producing forecast requests (thereby creating a "feast or famine" affect)
 - Requests are becoming more complicated and cumbersome
 - In some cases requesting units are asking for a disproportional amount of count data compared to the project scope and limits (4-5 alternatives when only one is required; counts in areas far away from project limits)
- Forecasting units rely predominantly on TSG (and consultants to a less extent) for collecting traffic counts. Turnaround times for receiving counts determine how quickly project level forecasts are completed and thereby have a direct impact (positive or negative) on meeting project milestones and deadlines.
- **Field count collection to support these forecasts is currently taking 8-10 weeks to turn around.**
- Average turnaround times for forecasts (as listed on TPB's website) are:
 - 5 months – bridge projects
 - 6 months – widening projects
 - 6-9 months – bypass or complicated new location projects

2. The current arrangement and individual responsibilities for traffic count collection lends itself to an isolated, reactive approach for count data delivery.

- As cited above, at least **five** separate units have some level of count collecting responsibility in the Department and are attempting to be as efficient as possible within their respective "silos". This arrangement has evolved over time; shaped predominately by the specific needs, timeframes, and requirements of count data by other units or by state/federal requirements.
- One unit is driven by meeting annual federal requirements, while another unit is attempting to address localized needs, typically related to safety and operational issues.
- Other factors also include staff and resource shortages which have required units in need to procure services of PEF's vs. finding a way to collect data through existing manpower in one of the other units in the Department.



- Four out of the five collecting units are also consumers of count data. Other direct consumers include the Traffic Forecasting Units, Pavement Management Unit, and the Road Inventory Unit. The uses of traffic data for those units is listed in the boxes above, other preconstruction units such as Project Development and Environmental Analysis (PDEA), Roadway Design, and Feasibility Studies are indirect users of such data due to their need for receiving timely traffic forecasts which have a direct impact on project and design decisions.
- The current arrangement makes access and knowledge of when, where and how count collection occurred difficult. **The lack of historical communication and collaboration between these units results in lost opportunities to optimize resources and manpower.**
- **Lack of communication has already created instances of duplicative efforts.** There were six (6) recorded instances in the past three years where two different groups counted traffic at the same location, only one week apart. Due to lack of communication and a shared work plan, the units collecting counts were not aware of the previous unit's presence at that location.
- **Division Traffic staff indicated a lack of understanding and awareness of TSG's annual schedule** and the locations where TSG will be collecting counts in any given year. With advanced warning they could provide TSG:
 - Additional manpower to collect data for complicated projects
 - Recent count data from a site investigation which could serve TSG's needs (and therefore save manpower and time devoted to collecting those counts)
 - traffic control assistance
- **Unit specific policies and standards need to be rolled into a larger Department wide policy** to elevate visibility and understanding of the roles and responsibilities of both count collectors and consumers and what reporting mechanisms are required.

- TSU has a flexible contract that is used 80% of the time for collecting turning movements. The remaining 20% can be used to collect other customer count needs but those needs are not known.
- Outside customers do not know the specific requirements individual units are tasked to meet. Customers cannot easily find info on count data that is sometimes buried in sublinks—Division staff regularly field calls for volume info that can be cumbersome to find on TSG's website due to lack of search and sort capability (example—10 maps for Guilford County which requires an iterative process to find location of interest).
- NCDOT pays into the development and support of municipal signal systems but what traffic count data is NCDOT receiving from this cost sharing arrangement?
 - Municipalities conduct signal retiming tests every 18 months which could provide needed turning movement counts to support project level forecasts. Currently NCDOT is not taking advantage of these arrangements to request such data.
- Count collection by Rail and Divisions is stored at the level where it is collected. Access to this information is limited. Stakeholder and survey input revealed that the creation of a single location to capture, store, and view count data (past and present) would be a substantial benefit to NCDOT and its customers. Specific elements of this enterprise database should include:
 - Easy access from NCDOT's main website
 - User friendly search and sort capabilities
 - Assurances that the format and use for how the data was collected and displayed is properly explained

3. **No clear, coordinated plan for how to optimize use of technology and current traffic collection equipment to support more real time (or near real time) information for public consumption and awareness**

- Recent survey feedback from the ITS units reveal that the primary need of the traveling public is to provide better congestion related information in both urban and non-urban areas.
- NCDOT's current Traveler Information Management System (TIMS) is oriented to identify "incidents". However, other situations (such as bottlenecks or work zones) need to be quickly routed to the traveling public.
- **Currently only 10% of NC's interstate system has been instrumented with speed sensor detection.** New privately developed approaches offer the ability to utilize GPS (becoming an industry standard by 2010) to treat vehicles as "traffic probes" to detect and communicate back congestion conditions.
- NCDOT was awarded a federal grant (\$800,000) to expand coverage (for 2 years) of travel flow information for the entire 1200 miles of NC Interstates under the I-95 Corridor Coalition Vehicle Probe project. However according to a memo (dated July 31, 2008—see Appendix X) from NCDOT's Chief Engineer to NC's FHWA Division Administrator, the Department was cited as having "many business units that are currently collecting data for their own use and not looking at the broader scope of how others within the Department can utilize the data collected". Other key points from the memo include:

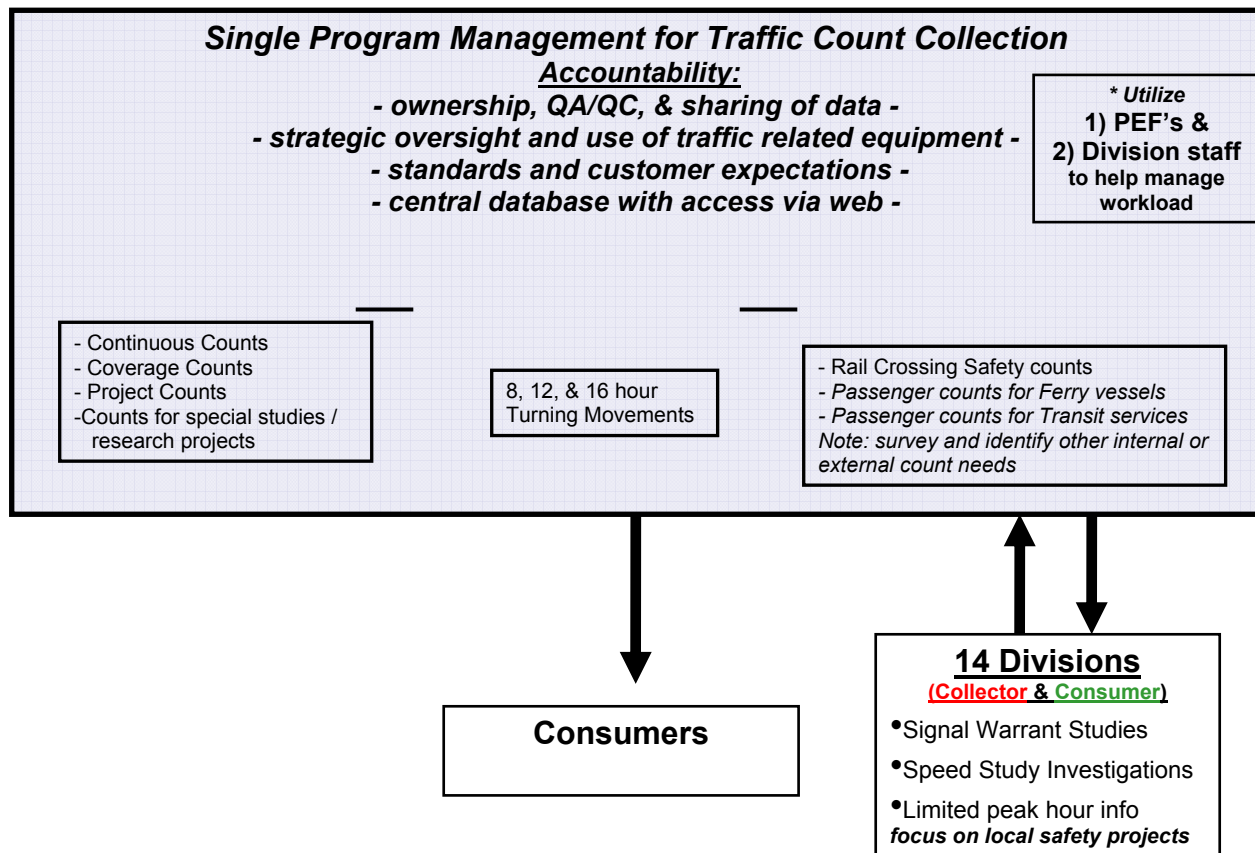
- NCDOT agrees with the need for comprehensive data collection and warehousing of data currently collected as it relates to traffic volumes and speed
- The Department will start the process of identifying all resources that currently collect traffic data, which includes speed, volume, occupancy, etc. Once all resources and types of data being collected have been identified a gap assessment will be performed.
- Gap assessment and associated solutions must be prepared by December 31, 2008.
- Neighboring State DOTs (Georgia and South Carolina) are taking advantage of an agreement established by Florida DOT and Northrop Grumman to provide free software that allows any State DOT to “autopoll” traffic volume information from their respective continuous counters to websites for viewing:
 - Roadway volume information
 - Public service information during emergency and evacuation situations
- Combination of volume info from continuous counters, probe technology and speed sensor detection could lead to an “instrumented, intelligent network” which addresses both near real time congestion condition and roadway volume needs. The lack of coordination (and pursuit of such a unifying network) has resulted in units specifying traffic equipment to meet singular purposes instead of meeting multiple uses. Additional research may reveal available equipment and technology which can provide both mobility measurement and project level needs.
 - ITS has documented the need for additional \$37 million dollars (minimum) of permanent detection equipment to cover the remaining interstate miles vs. \$8 million to extend probe technology contract for 10 years.

RECOMMENDATIONS

Two workshops were conducted (with collectors and customers) to present initial findings and “jump start” the process of turning the following recommendations into reality. Recommendations below reflect initial work of the TMT team plus input (and products already produced) from these two workshops. More information regarding the content and outcomes of the workshops can be found on page 19.

Overarching Recommendation

NCDOT needs a Better Operating MODEL to Manage its Traffic Count & Traffic Data Programs



- The consolidation of multiple count responsibilities within a single management model would enhance and raise the level of accountability, standardization of practice, communication, and delivery effectiveness.
- This model would create a centrally managed process to improve customer expectations for how and when traffic count data will be collected, analyzed, and available. **These central responsibilities are recommended to be housed under NCDOT's new Transportation Mobility and Safety Division (TMSD).**
 - Personnel changes needed to support this move include:
 1. moving 55 staff in TSG from TPB to TMSD.

2. Move Rail Division's current PEF oversight to TSMD. Rail and TSMD would adjust the current prequalification to address rail crossing count and special project needs.
- Single program management would create a single contract with PEF's (currently under Traffic Engineering and Rail Division) to streamline consultant management and provide increased oversight and cost containment. This arrangement should be done in coordination with NCDOT's new Professional Services Management Division (under Technical Services).
 - Single program management would also utilize the 14 Field Division traffic technicians in their respective areas to collect data as needed to balance large workload events/requests and to help disperse manpower needed to quickly collect data. Division staff should continue to provide their services. Study a method by which Division staff can log their counts into a central database that TSMD manages and post their count info on public sites with Google Live maps type access. and as the SDV concept advances their field counts could also be migrated into a database
 - Single program management would help support a coordinated, systematic process that determines the best, most economical and time efficient manner in which an incoming traffic count request could be:
 - Collected (in house or through the use of PEF's)
 - Turned around – providing the customer a reliable timeframe for the count data to be returned and in a manner/format the customer needs it.
 - Used to determine which type of equipment used – which equipment (portable, continuous counter, non intrusive radar, etc.) is the most appropriate and cost effective for collecting the specific count and customer request?
 - Posted on public site so that incoming requesters know when, why, who, and what that particular count was used for.
 - The process outlined above would reduce any duplicative efforts by various units and create opportunities for collection efficiencies if one request for count data is in the same geographic proximity to another request. Data could be collected simultaneously by the same staff or PEF's to reduce unnecessary expenditure of travel time and labor.
 - Single program management would simplify count request expectations for customers and should be used to drive the following **supportive** recommendations:

Supporting Recommendation

NCDOT Needs a Formal Governing POLICY to Better Direct Technical Efforts of its Traffic Count & Traffic Data Management Programs

- The single program management model is only as effective as the formalization of necessary roles, responsibilities, customer needs, standards and specifications for how traffic count data will be conducted and services delivered.
- With NCDOT's new emphasis on performance measurement, formal roles and responsibilities will also lead to the establishment of clear metrics (individual or

shared). Greater understanding of such metrics will lead to increased accountability and mutual interaction to achieve increased performance.

- Guidelines, standards, and procedures for individual units (which may have been done in the past) will now be required to be housed under a **single policy** for increased awareness for staff (or PEFs) responsible for counts and customers expecting counts.
- This new single program management model should also market the services which its comprehensive traffic count program can provide. Florida DOT submits an annual "Traffic Information DVD" that targets customers (particularly realtors, elected officials, real estate developers, etc.) with easy to understand reports on traffic services and publicly available data. An NCDOT version of such a product would help disseminate the Department's service to a wide audience and could be used as a reporting mechanism under the identification of user needs and requirements systematic approach outlined below.

<ul style="list-style-type: none">• Products already delivered from the first 2 workshops to support this recommendation include:
--

- **DRAFT Traffic Data Management Policy, containing:**

- A new policy statement and goals which emphasizes:
 - Teamwork, quality, minimizing duplication, focus on new technologies, meeting requirements, integration of resources, and providing data that is accessible and meets the needs of users
 - Establishing engineering practice and standards needed to meet specific customer requirements.
- A small **Traffic Data Management Committee** should be formed to help govern and facilitate the overall development of this policy. This Committee should ensure regular interaction with users so that needs, information exchange, and improvement ideas are heard, captured, and addressed quickly.

- **DRAFT Inventory of Traffic Data Collected:**

- Currently a two page spreadsheet which itemizes who collects what, why, and how

- **Changes to TEESB's Traffic Data Collection Request Form:**

- Traffic Engineering has submitted their contract for comment to the workshop participants in anticipation of the need to increase the use of currently contracted firms for a larger variety of data collection.

- **DRAFT Survey (as a first step) to support a focused, systematic approach** to capture any remaining traffic count data needs from Department customers. Particular steps include:

1. Developing and distributing this **Survey** to further identify other user needs and requirements (beyond the ones already identified in the Draft Inventory). Survey would eventually circulate to other state agencies, and to municipalities and MPOs/RPOs and other external customers.

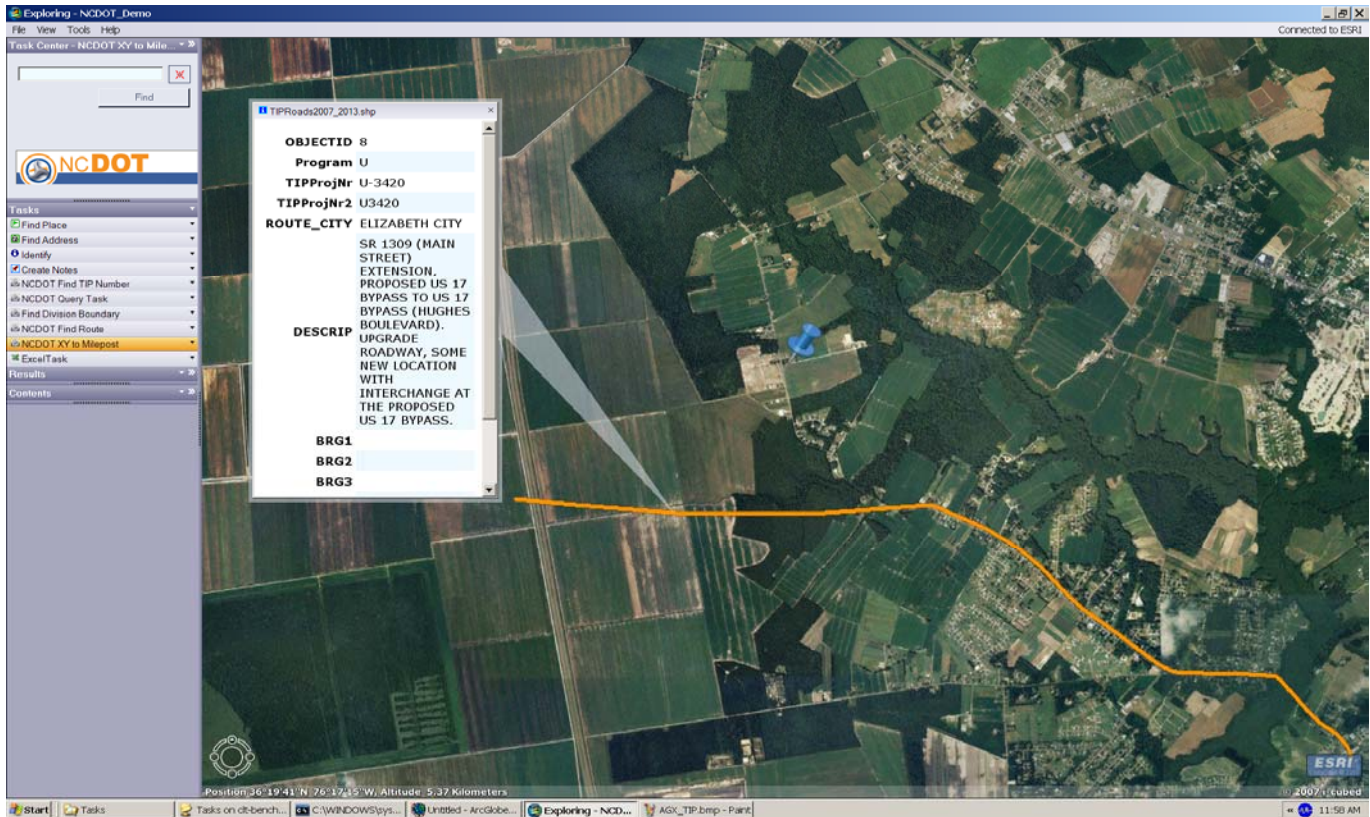
2. Build a set **formal standards and specifications** tailored to meet customer needs and requirements
3. Enhance the DRAFT Policy to capture info collected from steps 1 and 2
4. Formally **adopt the Policy and use it as an operating guide to manage the traffic data collection program**. Build the policy so it is flexible and can grow over time as customer needs and/or requirements change.

Supporting Recommendation

NCDOT needs formal Guidelines/Decision Tree to Better Direct Business Units Requesting Traffic Forecasts

- Since April 2008, a cross-section of staff has worked to build a Draft set of guidelines to support this recommendation. The guidelines are referred to as **“Guidelines For What is Required When Requesting Traffic Forecasts”**.
- These guidelines are expected to be completed by **October 2008** and should be adopted as Department policy to provide increased guidance for what information is required to fulfill a forecast request and to improve overall process with completing traffic forecasts.
- Establishment of these guidelines will lead to increased accountability, better decision making on if a new forecast is required (or an existing one suffices) and streamlined request and delivery process.

Supporting Recommendation **NCDOT needs to Leverage GIS Technology to View & Access all Traffic Count Data in a Single Location**



- NCDOT's Geographic Information Systems (GIS) unit manages a Linear Reference System (LRS) which has the ability to store and tag infrastructure data (such as traffic counts) to a position along a linear feature. This spatial environment and technology is being utilized by an increasing number of State DOT's to house multiple datasets of road inventory information in a seamless, easy to access manner.
- The manner in which such data will be viewed in the future is through a new tool referred to as the Spatial Data Viewer (SDV). SDV is an emerging IT enterprise solution that standardizes how spatial infrastructure data can be deployed and viewed on desktops. Other benefits of SDV include:
 - Centralized Application Management - SDV is a "light-weight" application which offers easy upgrades without touching hundreds of PCs at the cost of hundreds of staff hours.
 - Viewing of central (consistent) data sources – users are always viewing the latest information (and the same information) regardless if they are in a Division office or central unit.
 - Ability to view spatial data that currently is only accessible by IT staff at Century Center or New Hope Center.

- Built in search and sort features and ability to run queries to find various information along a particular route.
 - Provides a platform for developing and rolling out simple customized spatial applications and functions.
- The SDV tool also supports the efforts of another TMT workstream to improve Data Integration across DOT's business units. In the future Data Integration will help NCDOT move away from data storage in isolation or on individual servers and instead cluster data in an "info cube" environment that pushes information to customers/end users through GIS maps or analytical reporting (such as DOTs' new performance Dashboard)
- Critical work in the future includes:
 - Determination of what data needs to be warehoused (such as other condition data—pavement records, bridge sufficiency, etc.)
 - Determination of the level and degree of security rights so consultants, public, developers, etc. can also access this same infrastructure data in one location.
 - Accountability of the quality of the data collected by units and provided to this warehouse environment.

✱ **Products already delivered from the first 2 workshops to support this recommendation include:**

- **Single Point of Contact Spreadsheet**
 - Tool to identify count location and information and tag it to a Google map interface for ease of viewing by customers
 - This spreadsheet could act as a template within the SDV application (new SDV Committee (see below) will study further)
- **Launch of the SDV Committee**
 - A new Committee (including representing from TPB, PDEA, Roadway Design, TIP, TSMD, Asset Management and Operations) will work with GIS to develop user requirements to shape the initial SDV application. Committee work is expected to conclude in Spring 2009

Supporting Recommendation

NCDOT Needs to Develop a STRATEGY to Leverage all Technological Solutions to support Mobility and Project Needs for its Three Tier Network (Statewide, Regional, Subregional)

- The single program management model (with traffic collection and ITS responsibilities under one roof) will create the "team-approach" necessary to pursue a vision of an "instrumented, intelligent network" which addresses both real time congestion condition and roadway volume needs. Team approach should support:
 - Comprehensive standards and specifications for traffic devices and detectors and procurement of those assets to meet multiple uses.
 - Determination of the most strategic locations to place traffic equipment based on need and travel conditions. Specifically investigating which equipment

- (permanent vs portable) is appropriate per roadway Tier (Statewide, Regional, or Subregional) and for how the resulting data stream can be easily accessed by internal or external customers.
 - Gap analysis of what equipment is needed now—replacement or researching new technology to serve NCDOT needs.
 - Research the municipal agreements and counts collected by cities to see what could be helpful for NCDOT.
 - Provide resources to Equipment and Inventory staff to bring Weigh Stations and WIM equipment to acceptable level of condition.
 - Research cost savings if NCDOT allows private contractors do large repairs on traffic equipment and utilize field Division electronics technicians for routine maintenance.
- The single program management model should pursue other technology solutions which may prove to be cost effective and enhance the quality of count data delivered to staff:
 - **The following two solutions were shared by TSG staff who recently attended a national conference on traffic monitoring:**
 - Oregon DOT Video Based Traffic Counts: A system which takes ½ hour to install at intersections and may prove to provide better quality data than the traditional direct observation technique for turning movement counts. See the following link:
 - Miovision is a vendor providing digital video technology and services to process the surveillance of vehicles into turning movement data. City of Greensboro is using this system
<http://miovision.com/home/index.php>

✱ **Products already delivered from the first 2 workshops to support this recommendation include:**

- **Survey of all Metropolitan computerized traffic signal systems in NC**
 - See schedule "D" agreements for municipal signal systems under Workshop summaries
 - Consideration of changing these agreements based on traffic count needs for NCDOT
- **User interface/Collection and Storage concept (proposed by Equipment and Inventory Control Unit and IRD vendor)**
 - Ability to tie portable, permanent, weigh stations, into a single database to stream volume information to the web. Concept needs further investigation.
- **Scheduling a field trip (November 2008) to South Carolina Department of Transportation to investigate their management of traffic monitoring and ITS devices.**

SUMMARY OF WORKSHOP RESULTS

Two workshops were held with representatives of Units involved in both collecting and consuming traffic data. The intent of the workshops were to share the findings in this report and begin a collective process for implementing the recommendations in short, medium, and long term succession.

* Agendas, presentations, deliverables and other associated documents for both workshops can be found at:

<http://www.ncdot.org/doh/preconstruct/traffic/safety/TSI/TMT.html>

Workshop # 1 (July 23, 2008) – attended by 30 staff:

- TMT presentation of workstream findings and initial recommendations
- FHWA overview of federal traffic monitoring requirements and best practice from other states
- Breakout sessions around the 3 main implementation areas
 - Statewide Policy
 - Central Repository
 - Strategic Plan for better use of equipment (along 3 Tiers)
- 9 short term deliverables were identified
 - 5 deliverables had due dates within 2 weeks of the workshop
 - Other due dates were by the end of August

Workshop # 2 (August 29, 2008) – attended by 20 staff:

- Presentation of Workshop #1 Deliverables that Defined:
 - Benefits
 - Next steps towards implementation
 - Timelines
 - Immediate: 1 month – October 2008
 - Short: 1-3 months – December 09
 - Medium: 3-6 months – March 09
 - Long: 6-12 months – August 09
 - Owners
 - Other key players
 - Issues/barriers/challenges
- 2 Technical Presentations from Traffic Data Industry
- Next Steps to Implementation after Presentation of August Deliverables
 - 1) Capture Complete User Needs, Customers and Requirements through a Survey
 - John Farley (GIS director) suggested using the Needs Assessment at this web site
http://www.fhwa.dot.gov/cadiv/segb/views/document/Sections/Section8/8_4_4.htm
 - 2) Develop a Model for specifications and standards to support these needs, customers, and requirements
 - 3) Enhance the Traffic Data Management Policy to capture all standards, specifications, and delivery methods. The Policy should also explain how counts should be collected, stored, reported and shared

APPENDIX

FHWA MEMO

JULY 31, 2008

Memorandum To: John F. Sullivan, III, P.E.
FHWA North Carolina Division Administrator

FROM: W. S. Varnedoe, P.E.
Chief Engineer – Operations

SUBJECT: Travel Flow Data:
Resources, Collection and Warehousing

As discussed at our meeting on June 24, 2008, the North Carolina Department of Transportation (NCDOT) plans to utilize the Transportation Community System Preservation (TCSP) grant of \$800,000 to expand coverage of travel flow information to all interstates in North Carolina using the I-95 Corridor Coalition Vehicle Probe project.

NCDOT has many business units that are currently collecting data for their own use and not looking at the broader scope of how others within the Department can utilize the data collected. NCDOT agrees with the need for comprehensive data collection and warehousing of data currently collected as it relates to traffic volumes and speed. The Department will start the process of identifying all resources that currently collect traffic data, which includes speed, volume, occupancy, etc. Once all the resources and types of data being collected have been identified, a gap assessment will be carried out to:

1. Identify geographic gaps in data collection
2. Identify technology based gaps in data collection
3. Identify data that can be shared among different business units
4. Identify other useful types of data that are not being collected but could be with current and future data collection programs

The Department will then develop a plan to close the identified gaps as well as archive and share this information so that any business unit within or outside of the Department can access and utilize the information to better perform their job responsibilities.

NCDOT's action plan for identifying the owners and types of data available will then evolve into how this data can be shared and archived for historical applications. Through discussions with various units the Department will develop a comprehensive Data Resource, Sharing, and Archiving plan that address the needs of all involved.

The action items identified in this memo will be completed by December 31, 2008.

For additional information, please contact Jo Ann Oerter of the ITS Operations Unit at (919) 233-9331, extension 233 or via email at joerter@ncdot.gov.

WSV/lgo

cc: Bill Rosser, P.E., State Highway Administrator
Jon Nance, P.E., Director of Field Operations
Lacy Love P.E., Director of Asset Management
Jo Ann Oerter, State ITS Travel Information Engineer
Meredith McDiarmid, P.E., Project Engineer
Deborah Barbour, P.E., Director of Preconstruction
Mike Bruff, P.E., Transportation Planning Branch Manager
Alpesh Patel, Transformation Management Team
William Beatty, FHWA, Asset Manager
J. Stuart Bourne, P.E., State Work Zone Traffic Engineer
Joseph Geigle, FHWA, Traffic Operations and Safety Engineer

STAKEHOLDER INTERVIEWS

Key/Critical Issues from Traffic Survey Group perspective Kent Taylor & Steve Piotrowski - February 27 & March 31, 2008
--

Acronyms

PTC – portable traffic counts
ATR – Automated Traffic Recorders (see also statewide map)
TSG – Traffic Survey Group
WIM – Weigh In Motion (see also statewide map)
AADT – Annual Average Daily Traffic

GENERAL NOTES

Inventory of Count Equipment

- TSU keys on 3 services:
 - Continuous Counts
 - Coverage Counts
 - Project Counts
- TSU has 40K PTC stations across the state but collects 30K counts per year
- TSU publishes AADTs at 25,000 stations per year

Q: It costs \$55 / PTC from start to finish – what does cover the dollar amount cover? Is it only a labor rate?

A: This includes all direct costs for labor, vehicles, supplies, travel, communications, training, mapping, analysis, and publication. This doesn't include costs associated with equipment testing and repair or counter replacement costs, overhead, or benefits.

Q: 1500 PTC counters will be replaced from only volume counter to veh. class counts—when will this occur? What is the overall strategy for volume to vehicle class counter conversion, i.e., what criteria is used in choosing particular counters and what locations have a priority? Has a timetable been established for this migration?

A: We are purchasing portable classifiers this year and will be phasing them in this Fall. It will take about a year for training and to finalize the related development for full implementation. We will use the classifiers for both short term class and volume counts.

We are developing a truck data coverage of the primary route system. The development of this coverage is independent of the volume coverage. Class data collection is more complicated than collecting volume data. Analysts are identifying the segments and field technicians are selecting the count locations on the segments based on safety and collectability. Once we know the class station locations, we compare this to the volume coverage stations and discontinue the redundant stations. We can generate volume data from the class data. There is more variability in volume data than there is in truck data. Therefore we need fewer class stations than volume stations. We will still have many more volume stations than class stations once this development is completed.

Q: Total WIM stations in NC?

A: 45 Stations (defined as all lanes at a location) where we have 60 Sites (some lanes at a location, some stations have more than 1 site)

Q: How many WIM stations are currently operational?

A: 17 Stations

Q: Why are only < 1/3 operational? What are the current locations of the 17 that are operational? (Can you send a shapefile, PDF, or spreadsheet indicating these locations?) What is the strategy for when to activate more and in what priority order will this occur?

A: We took over the WIM systems for the LTPP research project in 1996. This project ends in 2009. LTPP allows us to estimate loading at an LTPP site based on previous data. Many of the LTPP locations have poor conditions for collecting good quality WIM. Due to these factors, we have not been replacing sites (LTPP requires sites, not full stations) when the sensors fail. We meet the requirements of the study by estimation for those sites that have been discontinued. We will be phasing LTPP out at some point. See notes below regarding future WIM development.

Q: How many ATRs stations in NC? How many ATRs are operational? What are the current locations of the ones that are operational? (Can you send a shapefile, PDF, or spreadsheet indicating these locations?)

A: 80 stations (121 total through the program's history, some have been discontinued as they were not needed). ATRs are a single inductor loop but when we go to replace them we will construct 2 loops to calculate speeds. 15 ATRs were replaced per the last contract

Q: When is the next contract expected and how often is TSU studying the effectiveness of the existing ATRs to consider which ones to close or new ones to establish? What is the overall strategy for how to roll ATRs off or replace them with WIMs?

A: We are able to use WIMs as ATRs, therefore, we are focusing on WIM development to meet the needs of both. We are developing the data systems now to integrate use of the WIM data for both purposes. We went ahead and updated the ATRs in the eastern region as we know we need more stations for factoring recreational travel. We need to retain these ATR stations as well as add WIM stations in this region.

What drives WIM selection is truck travel. The research being conducted now will define our needs for these systems. We will select WIM based on this and identify the most suitable locations. Once these have been identified, we will evaluate ATRs for redundancy, eliminate those stations no longer needed, upgrade stations that are still needed, and add stations where needed. Both systems are needed, but they will be integrated as much as possible.

- Any WIM station can be reported as an ATR
- ATRs and WIMs are capable of capturing more detailed data
 - What are some examples of this data and how costly would it be to collect it?
 - As new ATRs with 2 loops are constructed can they also be equipped with communication devices to send real time info on speeds? Can similar technology be equipped on WIMs? If this can occur in a cost effective manner what would be the best strategy for choosing which ATRs and WIMs to equip?

Examples of Costs

ATR – 4 lane with 2 loops per lane and 1 cabinet - \$40,000

WIM – 4 lane with piezo-loop-piezo arrays (BL Class 1 piezos) in each lane and 1 cabinet - \$100,000

These examples are somewhat dated (2 to 3 years) and would be higher today due to the high inflation on construction costs.

There is very little added cost for installing a second loop at an ATR.

The WIM cost is for the least expensive WIM sensor on the market. These are the least precise also. As your precision increases, the cost increases exponentially. A single BL sensor as we use is about \$900 (uninstalled). The next level in precision, the quartz sensor, is about \$10,000 for the same thing.

Bending plates and load cells require structures to support them to be built in the roadway. The cost is significant for these.

ATR

1 loop per lane - volume counts by lane – we capture volume in hourly totals

2 loops per lane – volume counts and speed summaries by lane - we capture volume in hourly totals and we are experimenting with speed bins (e.g. 5 mph bins where all vehicles within the speed range of each bin are counted).

WIM

We use a piezo–loop–piezo sensor configuration in each lane (called a sensor array). The piezos weigh axles and capture speed which with timing is used to calculate the axle spacings. The loop identifies which axles go together. The number and spacing of the axles gives us vehicle class. The sum of axle weights gives us gross vehicle weight (GVW), and so on. Essentially, we classify ALL vehicles, but we only record weight records for trucks (cars do not affect pavement design). Weight measurement is difficult under the highly dynamic conditions of vehicles in motion. We are not able to weigh all trucks (but we get most of them). WIM require more maintenance and must be calibrated using a truck with known weights (we contract with a trucking company) on a regular basis.

WIM Data

Classification – volume by class by lane – we capture class in hourly totals

Weight – A record for each vehicle for class 4 to 13 by lane – each record has time, lane, class, GVW, individual axle weights, and axle spacings

All of our continuous monitoring sites are equipped with telephone lines and can be connected from a remote location. The counters do not SEND real time data. However, with the Stopwatch system you can call into the counter and poll data from the counter in real-time (from all but 4 of our sites). We are ready to implement Stopwatch.

Q: What ways can NCDOT leverage existing traffic related equipment (WIM stations, tube counts, speed sensors, etc) to provide travelers more real time information (on the web, on cell phones, PDAs, etc)?

AND

Q: Can any of the existing equipment we own be used for multiple purposes, i.e., devices that can collect traffic counts but also act as speed sensors?

Answers:

- For PTCs no such communication technology exists that can be applied today. Idea is impractical.
- **A better, emerging solution is: PNITDS – Portable Non-Intrusive Traffic Detection System (or Portable Radar Count System)**
 - How does this work structurally?
 - Mast mounted system with pole attached to I-beam which can be extended and radar head sits on top of pole
 - Cabinet attached to pole/post w/ battery and solar controller
 - **Traffic Survey currently has 12 units that are deployable.** These are for short-term counts only. This system is used to collect 48 hour to 7 days of counts at a location (depending on the purpose) and is then removed. **It is FEASIBLE to connect a communication device to this system but it will be discontinued after a short time.** We use this only when we can't use our traditional tube counters. **These are not deployed weekly.**
 - Speed data can be extracted from this system
 - Time stamp on each axle head
 - **SOLUTION: This could be a way of identifying congestion and performance measures on a statewide map**

Q: Where and what would be the most strategic and cost effective placement of additional units? Could these units be installed in locations where ATRs are broken?

A: We are evaluating the radar heads for use as both temporary and long term sensors at ATR sites. The issue is they have high power usage which will drain the battery systems we use now. They would require AC power which we are trying to avoid (think green!).

ADR 3000 Counter (ATRs)

Q: “Stop Watch” system – what is the best technical definition for this system?

A: Stopwatch is a firmware we can load into the ADR 3000 counter that will allow us to connect to a counter and poll data real-time (can be used in WIM station too). In addition to the firmware, the vendor provides a simple software interface for use on a workstation to demonstrate its function and to check its operation. This software is not for use in propagating data to the web in real time. ITS will have to develop an application to poll our sites in sequence, send Stopwatch commands to the counter, capture the data, and then send the data to a web application. The vendor does not provide this as each customer does this differently. ITS will have to do this development. Stopwatch is the firmware. As stated elsewhere, SCDOT uses the Stopwatch system and is paying a company to do the web part for them. Here is a link http://www.scdot.org/getting/traffic_counts.shtml

Information on Stop Watch System

- Collects
 - Headway
 - Gap
 - Volume
 - Speed
- Needs to be converted to AC power only if a continuous connection to the counter over the telephone line is maintained
- Can we get data in 5 minute intervals---YES testing shows that we will not need to convert to AC if they call the counter and poll it at 5 minute intervals instead of maintaining a continuous connection
- Kent purchased statewide license and they can use “stopwatch” on any Continuous Count location
- Kelly getting funding for a project manager to develop IT support
- With continuous counts we sample the info with limited functionality
- SCDOT pays for a service similar to this
- Firmware is in some of the continuous count stations and 110 could be “activated” with the help of a vendor to obtain real time speed data
- Ultimately goal would be 250-300 of the sites
- Inrex uses *partial measurement* to gain insight on vehicle speeds
- Calibrate model to the locations

Q: Is the Stop Watch system the best answer to replacing ATRs in the long run?

Stopwatch provides a real time link to the ADR 3000 which is used in both our ATR and WIM sites. ATRs with single loops will give ITS volume counts only. ATRs with 2 loops and all WIMs will give you all of the data items listed above. It is not a replacement, it is an enhancement.

Q: 7000 signalized intersections in NC (cities plus what DOT maintains) – technology exists to collect traffic counts at those intersections and communicate them back to servers to upload to web. What are the pros and cons of outfitting signalized intersections with this type of

technology? What would be the most strategic use of this technology and what intersections would you target?

A: This is something you need to talk to Traffic Engineering about. We researched this as we felt that there are a lot of sensors and equipment maintained by them that have the potential for traffic counts. We found that the system loops (between intersections) provided good count data. We found the loops used at the intersections to detect presence had some data quality issues. These systems are already being used to manage traffic in real time. All that needs to be done is something similar to what we have with Stopwatch. These are AC based systems and they should be able to add anything needed to support real-time data propagation. The detectors can be configured to send a second signal independent from the controller. You just need something to interpret that signal and communicate it somewhere. They have much more of this infrastructure than we do (7000 vs 100)

I think ITSs needs are more significant than ours. We would be primarily interested in count data from the system loops. If good data can be captured from the presence loops, we could capture turning movement data at some intersections.

Q: Are there other arrangements for collecting traffic counts? Outsource equipment and responsibility to the Divisions? Outsource some of the collection program to private contractors?

A: Only outsourcing is for Origin-Destination studies. We contract for continuous count site installations. They install everything but the electronics. We install and maintain the electronics.

The Divisions already collect traffic counts on a limited basis. Consistency between the 14 groups would be an issue. Some States do this successfully. Others have a lot of problems with it. None of what they collect is used to meet the data requirements we meet. I have heard both good and bad stories about outsourcing traffic counts. Data quality is the primary issue. Some consultants collect data, others generate numbers.

Q: Have you studied the possibility of one central database to store any and all traffic count information that appropriate DOT staff would have access to? Ex. Div Traffic Eng does a 24-hour count for signal study and uploads that info to the database which displays that count info on a mapping interface—one map with all the counts! What other pros/cons would be associated with this type of database?

Answers:

- Greatest concern with such a database is QA/QC
- Counts could be accessible on one large statewide map however NCDOT should CLEARLY CITE:
 1. methodology used to obtain a particular count
 2. who collected the count
 3. time it was collected

It makes sense for DOT to be the statewide repository for traffic data. We collect the most and we have the greatest need. ITS needs to start archiving its data. It collects a lot of data but does not propagate it to other users. It could meet a lot of other DOT needs. The repository should be just that, a data resource. It should be up to the individual user of that repository to exercise good judgment in its use. It would be prohibitive to QC all data deposited. This should be done by the individual user. Hence, the need for documentation of some sort (as listed above).

If this approach is taken, then this probably would be an IT operation. Databases, file storage, and web access would be required. All IT responsibilities. Traffic Survey would be both a provider and user. Ideally, hanging it all on the LRS would be preferred for power users such as Traffic Survey, but the feasibility of this would need to be studied.

Q: What resource challenges do you face? What ways can your unit be more responsive to other business units and the public? If you had more funding how would you use it?

Answers:

4 current Supervisor vacancies therefore Kent & Steve absorb this additional work

- Retention of employees
- Few promotional paths
- All data reliant on Linear Referencing System
- Need at least one more engineer

Given more \$ Kent would invest in WEB BASED DELIVERY of traffic count data

- User can click on geographic locations/points via Arc Mapping interface (or supported by LRS and/or Google map technology)
- Florida, Illinois, and Iowa are using this system –
- Real time is not feasible for us. ITS can do real time with our continuous counters. Portable counts would not be real time. I was just indicating that it could be published in a different way than we do today. Raw data as soon as the basic QC checks are completed. Factored data when the analysis is complete. Progressively through the year instead of all at once at the end. Web mapping would be critical to doing this effectively.

Transfer all traffic count data to LRS

- Study for all Traffic Survey's uses data for migration to the LRS is complete
 - Road Inventory Unit is first in line to test LRS

Set up *Production Lines* for improving performance

- TPB is spending more on traffic data monitoring, staff must be trained and prepared to be more responsive
- IT support is variable in development activities

Q: Can TSU provide more details on the idea of migrating to a GPS deployment of devices in the field vs paper based system??

A: We are deploying GPS at the same time as the new classifiers this fall. All counts collected with these devices will have GPS data captured into the counter when installed. When we can't capture GPS, we will use our traditional descriptions to locate the counters. The old volume counters are being surplusd. Our more complex legacy classifiers will continue to be used but we will capture GPS in a separate file. We may even use it for turning movements in the future.

We can capture the data into an ArcGIS map and display the location. We can compare to previous coordinates to validate its location. We can use the coordinates to hang the data on the LRS. This enhances the quality of our location data and is more efficient for data processing.

The only way this will benefit the field (i.e. eliminate paper maps) is if we have electronic mapping. We have been waiting on GIS for a long time to support this more effectively. We want to generate all our maps in ArcGIS (as do many others). It still takes more work than our current processes and is not efficient enough. I am seriously considering using a commercial product to do this in the field.

Q: In what ways can our various units (Traffic Surveys, ITS, Traffic Eng) work closer together to share information, make decisions on equipment with shared uses? Are there additional partnerships we can make with municipalities and City DOTs that can benefit both parties?

Answers:

- PMU is a new customer for TSU
- FHWA Current research is LTPP – long term pavement performance research (phase out in 09)

- NCDOT research on developing the process for pavement design traffic inputs will have Preliminary recommendations by this Summer
- Outcomes of the research is:
 - help meet pavement designer needs
 - Identify class and weight seasonal patterns from existing WIM data
 - Provide preliminary regionally based traffic data inputs for the pavement design process from existing WIM data
 - Identify sampling requirements for WIM data to meet pavement design process (this Summer) in terms of number of stations, types of roads, regions, and sensor type.
 - Provide specifications for traffic data products for traffic forecasting

Q: What other ideas (besides the ones below) do you have on the best method for improving collaboration/communication b/w units that either collect or use traffic count data? Would quarterly meetings to share information and ideas be effective? What new or improved roles and responsibilities would you suggest?

A: I don't know that anyone has actually assessed every traffic data need for the NCDOT. We all assess and evaluate our own areas of interest. But an enterprise wide evaluation has probably never been done. I don't know if such an evaluation would identify large areas for improvement.

Roles and responsibilities sounds suspiciously like more work. I am all for more effective use of resources. I think availability is the key to that. If we could access it conveniently, verify its location quickly, and capture it into our processes efficiently, we would use every scrap of data we could lay our hands on. Each person responsible for a particular data need could choose to use what is available, or collect their own data. They are the best judge of what is needed for their purpose.

Key/Critical Issues from Work Zone Traffic Control Unit perspective
Steve Kite – March 6, 2008

Acronyms

WZTC – Work Zone Traffic Control
DMS – Dynamic Message Signs
HP – Highway Patrol
DE – Division Engineer

WZTC needs to know when to close a lane so you don't have a huge backup—

- Work Zone interaction is one week out of a year
- Not a data analysis unit but plan producing unit
- Take a snapshot for volumes by hour and establish lane closures

Traffic Count Needs for WZTC:

1) **Hourly counts** when volumes exceed capacity that closes a lane down

Texas QUEWZ is an algorithm currently used to **predict:**

- queue lengths
- work zone travel costs
- \$ to set up the work zone

2) **Specialized traffic data for seasonal peaks**

- Leaf season in the mountains
- Beach traffic on I-40 in the summer
- Special events like NASCAR

3) **Smart Zones** – some corridors are sensitive to seasons and quarterly fluctuations

- WZTC can't pinpoint when it will occur but knows it will occur during a specified range
- Technology automates the process and we can pinpoint when ADT is not representative--- sensors pick up speed volume, which can calculate delay or other info on DMS (4 to 5 on I-95)
 - Near Roanoke Rapids / VA border
 - Near I-40
 - 2-3 in Lumberton
 - 1 in Fayetteville

WZTC is after demand reduction tools

- Once we know higher volumes we want to provide alternate routes
- Queue for 5 miles it doesn't build to 10 to 20 unless there are no other outlets
- Alert motorists via DMS to exit and take detours
- Can give it to them in travel time or to a point in the road (like a milestone) of where this will a sense of reliability
- Few pieces of data but in a timely manner with strong protocols to better predict what may go on in a certain corridor for certain type of route

Timely Crash data is big deal for WZTC

- Work zones are temporary
- We would divide it into
 - 3rd party work zones (like utilities)
 - Construction
 - Maintenance

Solutions: HP should enter sketches into a database, DEs should have protocols in place, and WZTC should have access to that database

Work Zone Facts

- Typical one lane closure means you lose something like 65% of your capacity on a corridor like I-95
- Acts like a rehab corridor
- Interference of construction traffic on the open lane—artificially crushes your operating capacity
- I-77 north of Statesville also has long backups due to high TTST but light volume—key is that trucks acceleration takes a long time
- Primary notifiers for alerting motorists to alternate routes are Portable Devices!!

Q: How does NCDOT migrate towards a true Traffic Data Management approach for?

Answers:

- Leveraging technology that yields multiple purposes for the same equipment (i.e., continuous traffic count equipment that also provides speed info)
- Building a central database with a GIS interface that all traffic count, speed info, vehicle class info, etc would reside. Internal (and eventually external) users could pull latest (and historical) traffic related information. What are the pros/cons to such an initiative?
- Providing travelers with more **real time** info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc
- Piloting the use of Smart Zones and determining where to strategically locate them? What are the pros/cons of Smart Zones and do we have equipment already that support additional roll out through NC?

All mobility related personnel should be under one roof and one director

- Institute a statewide focus to make a device in Division 4 communicate with a device in Division 6
- Who should do this?
 - State Traffic Engineer—should study all the state's assets and consider how they can be linked and communicate—a true network approach not just incident management
 - Standardize use of policies, procedures, and equipment
- We will always have some need for roadside info (poles and sensors and RTMS) but predominantly we should use cell phones and GPS and use vehicles as our probes—a wireless blanket for managing traffic
- People are not looking for precision but accuracy
- We are measured by how much projects costs vs customer satisfaction

Questions:

From your perspective what resource challenges and institutional hurdles do we face to elevate the importance of ITS, Work Zone safety, and better Traffic Data management?

What ideas would you suggest for better communication, coordination, and information sharing b/w the major business units re Traffic Data management?

Is the Department properly aligned organizationally to deliver a good Traffic Data management approach? If not, what suggested changes would you recommend?

How could NCDOT benefit (or not) from additional partnerships with local gov't and the private sector to provide traffic data services?

Answers:

Use private vendors to the greatest extent possible and be strategic about how to use them

Business Model should be:

- Vendors purchase, maintain, service, and upgrade equipment/devices such as:
 - Changeable message signs
 - Wireless communication equipment
 - Sensors
 - Algorithms
- Take advantage of vendors who are already acquiring data we need
 - Traffic.com
- **NCDOT manages the vendor and does the following:**
 - 1) Utilizes technology to coordinate the equipment and what the messages should say
 - 2) Prequalifies vendors based the situation/project/special needs or events
 - Cited example of concrete curing on a project and we were pulling up the lane closure
 - 3) Purchases or uses the information from the vendor's equipment (speed, volume, vehicle class, vehicle headway, etc.) back to our servers and for potential real time web delivery of information

Dynamic lane merge in urban conditions

- As the sensors detect speeds of less than 20 mph, it knows you are stacking the lanes, so it changes the messages on the boards
- Sensor on wheels on the back of a trailer vs RTMs on poles so you can move it around
 - Maybe 10 sensors for a 5 mile lane closure
 - Place sensors where you can get the speeds
 - Sensors can then communicate with all other devices
 - Sometimes use portable cameras, but mainly for resident's office to verify the traffic info is correct and in some cases we keep it in permanently
 - If its satellite we can transmit sensor info from Fayetteville to DMS in RR!!
 - We want to purchase data directly from the vendors who are acquiring it!! So that we can control the messages on the DMS or portable signs etc
 - **NCDOT does not use DMS for traffic management but for incident management**
 - **We need to manage volumes of demand and to move traffic in the peak hour**

Q: What other best practice efforts in Traffic Data management from other states are worth studying (perhaps modeling)?

Answers:

- **Minnesota DOT model is what we are mimicking—structured program to study**
 - Use the web to find out if you are prequalified and click here if you want to become prequalified
 - Toolbox is guiding the designer to get the same solution
- **Missouri DOT has a great model for traffic data management**
 Brian Chandler—Traffic Liaison Engineer
 573.751.5678
 Brian.chandler@modot.mo.gov
 Automated Speed Enforcement
- **Marty Weed—WSDOT**
- Ohio DOT – good sources for data—you can see right away which lanes to close

Other Points:

- Create customer confidence for true web based delivery of information
- Display data in a user friendly and understandable manner
- Non work zone applications may also need travel time info with private vendors
- **Goal is to fill in and supplement permanent devices**
- **Technology is not the end all, but rather hwy capacity and work zone capacity and engineering principals should be driving decisions**
- **Technology is the last feature that tightens everything up—caulk that seals the deal**

<p style="text-align: center;">Key/Critical Issues from ITS Systems perspective Cheryl Evans and Muddy Murr – March 20, 2008</p>
--

Acronyms

MPO – Municipal Planning Organization

WZTC – Work Zone Traffic Control

IM – Incident Management

ITS – Intelligent Transportation Systems

Q: How does NCDOT migrate towards a true Traffic Data Management approach for?

- leveraging technology that yields multiple purposes for the same equipment (i.e., continuous traffic count equipment that also provides speed info)
- building a central database with a GIS interface that all traffic count, speed info, vehicle class info, etc would reside. Internal (and eventually external) users could pull latest (and historical) traffic related information. What are the pros/cons to such an initiative?
- Providing travelers with more **real time** info on avg speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc
- Piloting the use of Smart Zones and determining where to strategically locate them? What are the pros/cons of Smart Zones and do we have equipment already that support additional roll out through NC?

Answers:

Evans envisions the creation of a true Statewide ITS Plan:

- A statewide plan does not currently exist
- Equity formula dictates regional approach
- Regional plans have been developed with statewide needs in mind
- MPO's have been roadblocks for statewide plans
- Plan provides overarching policy and strategic use of permanent detection equipment – where it should be placed and why:
 - Communication devices would be key:
 - Rural and coastal areas would be expensive to equip with fiber
 - Urban areas will not have a problem with bandwidth
 - Focus on deploying ITS equipment on key corridors (regardless of Division and Regional lines)
 - Develop databases that can pull ITS info by routes
 - Take advantage of technology and strategic partnerships to make more cost effective decisions
 - Migrate towards a third-party web hosting service
 - Radio devices that communicate with a single hub
 - Most States have a central server where other agencies can go in and upload traffic information---roadblock to this is our IT staff

Other Comments

- Portable equipment is good for short term traffic or incident management and are susceptible to vandalism
- PNITDS – can it withstand adverse weather and what is the sustainability
- Study NC One Map
- Evans is currently holding meetings to ascertain Division Engineers' priorities on deployment area or particular corridor---by March 2009 Evans will have a true statewide inventory and plan for deployment along strategic highways per region

- Improve TIMS -- Wireless link needs to be created b/w IMAP staff or first responder and back to TIMS HQ
- Study Charlotte --- start where existing technology exists—Charlotte is almost seamless in their operation—roadside speed sensors (RTMS) on I-77 and I-85. There is an RFP to determine how many are operational today

Q: NINE ITS Deployment plans—has it helped or hurt?

Answers:

- Every urban regional plan identifies the need for a traveler information clearinghouse—best thing to meet this has been TIMS thus far
- Regional plans have helped but we have yet to mainstream ITS into project development projects
 - We piggyback on new projects but some standalone projects are needed to showcase the importance
- Put in a communications infrastructure
- City of Charlotte has provided match money for grants
- Cities have a participation in the closed loop signal system projects and help with cameras and operation center
- RFP for ITS planning in Triangle is KEY—TPB, Public Transportation, CAMPO, DCHC to update the Triangle Strategic Deployment Plan---use IDAS and create the ability to determine what ITS equipment/projects can help squeeze more volume out of capacity (this will benefit AQ conformity) and truly “quantify” ITS benefits from a demand standpoint
 - PILOT for developing a process/guidelines on how to mainstream ITS into metropolitan planning
 - Finish in 9-12 months
 - Decision on consultant by end of March
 - Get a copy from whom?
- JoAnn has an RFP for SmartLink—ITS operations
 - Internal operational system from one central workstation
 - To pull up signs, cameras, and detection
 - Make all assets NTCIP compliant
 - RFP going out next month
- JoAnn or Kelly developing an RFP on Operations & Maintenance Manual

Interaction with other BUs

- Need to bring TSU to the table as a true partner
- ITS should be working and sharing strategy, use of equipment with TSU
- MPO's say it is challenging to get data from NCDOT
- IDEA for balancing permanent detection vs portable detection: Use permanent detection on the Statewide tier and let TSU use portable equipment on Regional or Subregional tier routes

TO DO: In order to build a business case to Kent to reconsider his hold on equipment get all of our “end users” to put together a business case for 1) what you need and 2) why you need it 3) what TSU can do to help

- JoAnn Oerter
- Division Traffic Engineers
- WZTC

Q: From your perspective what resource challenges and institutional hurdles do we face to elevate the importance of ITS, Work Zone safety, and better Traffic Data management?

Answers:

- **Personnel, personnel, personnel**

- Don't have enough and not enough expertise
- Facility challenges---where do we house equipment and staff—in Division offices
- Who is going to operate and maintain 24 hour data?
- CEvans has latest copy of statewide GIS Arcview that shows every detection device
- **Funding**
 - Need stand alone projects
 - ITS is the first thing cut out of projects when budgets are constrained or overrun
 - Need a statewide ITS server
- **Use an ITS toolbox – if you are having a safety problems – you must show benefit-costs for spot safety funds**
 - Shoulder mounted “prepare to stop” prior to onset of yellow on US 70—helps reduce fatalities to help people from running the light
 - Combination of portable technologies
 - Speed warning signs

Q: Is the Department properly aligned organizationally to deliver a good Traffic Data management approach? If not, what suggested changes would you recommend?

Answers:

- Create a hierarchy to manage traffic data management (at a central place) with different BU's reporting up to one Director
 - Design
 - Forecasting
 - Surveys
 - ITS – planning /operations
- Doing this would create natural business efficiencies due to close proximity
- Having quarterly meetings with all involved without them being under one umbrella won't help...it hasn't with IM, ITS, & Signals

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

Answers:

- Use financial resources of media outlets to purchase the equipment and deploy it for the delivery of traffic data—cost share for both the equipment and the visual feeds coming from the cameras – WRAL does not own the triangle equipment
 - Opportunity for this type of arrangement still exists for Triad, and Metrolina

Q: What other best practice efforts in Traffic Data management from other states are worth studying (perhaps modeling)?

Answers:

3rd party solutions

Vendors who can provide real live streaming video—use their equipment and cameras and their feed and NCDOT pays for it & citizens can also get

<p style="text-align: center;">Key/Critical Issues from the City of Raleigh perspective HP Humphries – April 14, 2008</p>

Acronyms

WZTC – Work Zone Traffic Control

Q: How do you collect counts in the City of Raleigh currently?

A: Contracted service done by part-time staff with electronic counters and stored on network drives

Q: How often do you collect counts and in what priority order?

Answers:

- Some counts are collected per request but most counts collected every 2 years on all signalized intersections
- Majority of counts are peak hour counts (2 hours in AM, 2 hours at lunch, 2 hours in PM)
- There is also a historical collection of scattered 24-hour counts
- Typically staff is out collecting a count somewhere on a day to day basis
- Other examples of count requests or reasons the city collects counts?

Q: What devices are primarily used to collect counts? When and how do you determine when to use these devices?

A: Could you break down what percentage of time you use electronic counters vs system detectors (like loops)? Is it 80% to 20%?

Q: How many signals does the City of Raleigh maintain?

A: 509

Q: Are any of your devices outfitted with wireless communication equipment that allows for information sent back to a server in real time?

A: NO. Only 5% of the 509 signals maintained by the city do not have some form of a communication link.

Q: When was the computerized signal system installed and what key features does it provide?

A: Major upgrade is underway (stage by stage finished by 2011) including:

- Adding 35-40 more cameras---used for observation and to improve incident clearing, routing, and signal timing plans (camera feeds will also be shared with NCDOT)
- Traffic responsive strategies targeted towards major corridors such as Capital Blvd, Glenwood Ave, etc.
- Signal timing can be changed from PC's
- Wireless communication might be used in places where you need to jump a bridge, etc.
- All copper wire replaced by fiber; camera images can be pulled up on desktops

Q: Did the original features include a traffic count and GIS interface to track vehicle counts in real time and post them on the web?

A: NO

Q: Does the City of Raleigh have a strategic plan for how to manage traffic data today and into the future?

A: No strategic plan currently but there is a need for a greater regional focus or a Plan to connect the various city systems within 5-7 county Triangle region

Q: What technology (or other hardware, software) features are you studying to improve how you manage traffic data?

Answers:

- Key Need is to post count information electronically
- Developers who request traffic count/volume information are faxed a copy

Key/Critical Issues from Traffic Forecasting Units, TPB
Mike Orr, Karen Roberson, Richard Tanner, Darryl Austin – May 1, 2008

Responsibilities for utilizing traffic count data

Q: How and why do you use traffic count information? What are the primary technical uses for this information for your group? Be as specific and descriptive as possible.

Answers:

Counts are used to:

- Create time-series projections and trend line analysis...for example IF AADT only goes to 2005 and we need 2007
- identify traffic factors and turning movement data
- conduct project level traffic forecasting
- for special applications---example = hand allocation model
- for almost every forecast there is a need for traffic count information:
 - basic stuff like DHV or truck percentages
 - new traffic data/counts requested for almost every forecast, even simple bridge forecasts—90-95% of the time
 - if bridge unit in PDEA could eliminate counts on intersecting roadways on either side of the bridge it would reduce count need by 50%

General Comments.

- NO schedule or advanced warning to know when next forecast is coming
 - Majority of forecast requests are coming from PDEA currently
 - 2nd most requests are from Feasibility Studies—ordering U, R, I
- If the unit had more forewarning they could manage their work better and help Kent manage his work better
- IF unit could identify a pattern of seasonal forecasting work they could better prepare work for Kent based on size
 - Maybe knowing on a quarterly basis whats coming so you could manage this better
 - PDEA has been asked to provide this ahead of time but they have not given a clear response
 - In many instances PDEA asks for more than they need---asking for 4-5 alternatives when they only need one

Q: Based on question above, who are the primary customers (within the branch and outside the branch) that receive your forecasts? What is the typical turnaround time provided to those customers? What percentage of your time is consumed by special requests and where do those special requests come from?

Answers:

- **Turnaround times from Kent for traffic data**
 - A hardcopy of count already taken is one week typically
 - IF the request is for Class Counts and Turning Moves—turnaround is anywhere from 2-4 months
- Not always clear when you can expect your data---may not get a response from TSG for 2 weeks
- If there was a Database that showed historical turn move data at locations around the state, potential 2-4 month minimal savings in this unit's work
- There is not a convenient way to see which counts are available
- From 1998 to 2001 a "hole" exists where someone may have done a forecast but the unit isn't able to use it
- There is no central database or reference map for Tube Count or Class Counts—so the forecasters have to ask Kent

- Current turnaround time for project level forecasts is 5-7 months---therefore a 2 month cushion is built in for variability
- All traffic count requests seem to be treated with equal importance....what ideas do you have for how we start to prioritize?
- A formalized POLICY is necessary to know when its OK to go through non-Traffic Survey unit to collect counts and for what purpose
 - Consider a decentralized vs. centralized approach for count collection
 - Consider what types of counts the Divisions could collect vs what should be contained in a central database for this unit to use
- Darrel Austin used technician in a Division office to get count info in 3 days for volume info that he needed
- Advantages are:
 - Division staff lives in the area and can collect info as part of their regular responsibilities
 - Time and \$ savings for Kent's staff especially if its Division 13/14 trip
- However with a centralized staff (like TSG) you work with the same people and relationships are established
 - What about a model where this unit works with Kent and he manages who to call in from specific Divisions?
- One turning move is 16 man-hours of work with manual counter unless you can collect this from detection devices in the signals---OR can DOT find a device similar to NuMetric that can help with turn move info
- Technology would need to be portable---to count volumes on approaches but to count the turns too
- IDEA: Work toward a program or technique to reduce the number of turn move requests
 - 3-legged intersection:
 - Put a tube counter on each approach to the intersection
 - Set up 2 equations and 2 unknowns and calculate your turn info
 - Turn moves can be factored up from 16 to 24 hours
 - Count for 16 . Therefore you have x1 and x2
 - 4-legged intersection
 - Use similar approach as 3-legged intersection but for very rural low volume roads where thru volumes are negligible
- IDEA: Move away from manual tube counts to collecting counts thru radar technology
- Another way to not order counts is to get a handle on some truck percentages and factors from a local or regional perspective – such as the old ATR bound books
- Kent provides shapefiles for this year's AADT so with some work all that could be converted to a single map
- 2006 shapefile contains some counts from 06 and 05. This is due to:
 - rural program vs urban program---HPMS requirement being every 3 years and needing to have a rotation
 - Rural area AADTs:
 - Primary routes = counted every year
 - Secondary routes = counted every other year
 - Urban area AADTs:
 - Primary or Secondary = counted every other year
- Problem this creates is in the time-series work where rural routes shifts into an urban route and you have gaps in the year counts are collected

Q: Do you receive all traffic count information from our Traffic Survey staff or do you also receive counts from other sources (such as from Divisions or Traffic Engineering)? If you receive counts from a group not mentioned please list them.

Answers:

- Majority of count information comes from TSG
- Occasionally Divisions are called upon to provide counts

- Once in a while you get requests from Div Maint or Div Construction or Roadside environmental (less than 5 %)

Q: In what format do you currently receive traffic count information? What improvements would you suggest for the delivery of this information to you (specifically ideas that speed up the process, leverage technology, make your work more efficient, etc.)?

Answers:

- All count info comes as a hardcopy, why not get it electronically?
- TO DO: Follow up with Kent why his staff is not sending electronically?
- 1-2 days savings just in receiving info electronically VS. having to retype the numbers into a spreadsheet

Q: What ideas do you have for improving the way traffic count information can be accessed by internal and external customers? Should counts collected by the various DOT units be captured and archived in a single database? What are the pros/cons to this idea?

Answers:

- There is no access currently
- Ideally a database (or library) linked to a state map that shows everything that was historically collected at specific locations would be best solution. (Note: similar to Mark Tyler's Info Cube plus Spatial Data Viewer concept)
 - This type of tool should include the ability to select a range of years to study
 - From a CTP perspective---it would be helpful to have AADT historical counts for a point location that you could pull up 10-15 years of history to do your trend line analysis
 - Central database that tells you what type of count taken and when it was taken---get that going as a baseline and then you can go back and add historical info
- In the INTERIM can the current year traffic count data be migrated into a simple database---provide reference data for tube counts and vehicle class info
- Best thing is to have a simple reference file and map indicating what following data is available
 - Turning move counts at specific locations going back 5 years (rural areas) and 2 years (urban areas)
 - Hourly counts and class counts and manual class counts on primary and secondary counts
 - Hundreds of volume counts are collected for big regional model updates
 - If Kent has something like this why can't this unit see this too?
- 6 staff doing traffic forecasts statewide
- 300-400 turning move counts are collected each year by TSU
- 35K coverage counts per year
- Special count requests for hourly and tube count requests---

Q: What type of time and resource savings could be incurred if all traffic count information (historical and current) was more readily available and formatted for use in the forecasting tools you use? (I'm looking for a rough percentage estimate of time/cost savings)

Answers:

- This unit can augment their spreadsheet tools to better receive whatever is sent electronically
- 1000 requests for individual counts per year which amounts to 200-300 TIP projects??
- Plus all the counts needed for CTPs
- David Price is the contact for ordering counts and data is returned to him and he delivers it. Does he receive requests from other branches or units too?

Q: What are your suggestions (short and long term) for how traffic counts could be more efficiently or strategically collected? Do you think we need more permanent devices or more weigh-in-motion stations or should NCDOT move towards portable devices (see attached photos in PDF document):

Answers:

- Why not count the primary system roads in the urban areas every year?
 - Maybe build more permanent devices for collecting this or add staff
 - Is there a way Kent can arrange his regionalized staff into an arrangement that mirrors 14 Divisions?
 - Responsibility should be broken up a little finer than the course level it is now

Q: Do you have any other suggestions/improvements regarding the collection, delivery and use of traffic count information for NCDOT?

<p style="text-align: center;">Key/Critical Issues from Traffic Safety Perspective Tony Wyatt – May 13, 2008</p>
--

Acronyms

TESSB – Traffic Engineering and Safety Systems Branch

ADT – Average Daily Traffic

FHWA – Federal Highway Administration

MUTCD – Manual on Uniform Traffic Control Devices

Traffic Count collection and responsibilities – TESSB perspective

Q: How and why do you use traffic count information? What are the primary technical uses for this information for your section/unit? Be as specific and descriptive as possible. Please also cite any state/federal requirements.

A: Traffic volume (ADTs, and turning movement counts), vehicle mix/classification, traffic growth and seasonal demands (historical), & traffic speeds are very important baseline core performance and utilization indicators for a wide range of the Department's transportation decisions. Many of the most heavily utilized performance measures for North Carolina's transportation systems are based on traffic volume and system performance data (like travel speeds, level-of service, emissions, fuel consumption, vehicle miles traveled, etc). A sampling of a few of the decisions that require accurate and current traffic volume and other traffic performance data include:

Traffic Signal Warrant Studies (procedure established under FHWA's MUTCD)

Multi-Way Stop Evaluations

Traffic Signal Phasing & Timing Decisions

Traffic Signal System Coordination and Timing Plan Development

Route Designations and Investigations

Truck Route

Traffic Safety Exposure / for Crash Studies & Crash rates

Control of Access Decisions

Pavement Designs

Traffic Impact Analysis

Local Rezoning

Business Site Investment and Financing Decisions

Intersection Design Decisions – volumes help establish number of and lanes and assignment of lanes. The volumes are also fundamental to the warranting and design of auxiliary turn lanes.

Corridor Design Decisions – fundamental intersection spacing and cross section selection decisions are largely based on traffic volumes and anticipated traffic demand.

All Capacity Analysis requires traffic volumes

Complex Site Traffic Impact Analysis & Access Management Efforts

North Carolina's Crash rates are very sensitive to traffic volumes – as the exposure is a key component of the derivation of crash rates.

Q: Based on the question above, does your section/unit collect most of your traffic count needs? Who else besides your group (i.e. Traffic Survey Group, or consultants, or others) do you rely on to provide this information? What percent (rough estimate) of total count needs are collected by you vs. these other groups?

A: The Traffic Engineering Branch through limited services agreement secures most of our own 16 hour intersection turning movement counts through the engineering firms we retain. We still rely on Traffic Services for a variety of corridor data, historical and seasonal data, specialized studies (research efforts and project specific – vehicle configurations, etc), and longer term speed type data. This number is not simple to ascertain due to the heavy reliance throughout so many areas for so many types of counts – our turning movement counts are just one of the many required “data” sources necessary for sound and defensible “evidence” driven decision making. For just 16 hour and peak period intersection turning movement counts I would estimate that the Branch is able to provide or secure approximately 90% of our simple – unadjusted – raw turning movement counts. However since ADT’s, weeklong or longer summaries of volumes and classifications are also heavily utilized in Safety analysis, Impact Analysis, and other Design decisions our overall Traffic Data consumption needs greatly exceed what we produce and we rely on Traffic Surveys, Branch Limited Services firms, Branch staff (often temporary), local governments, and even submitted traffic impact analyses. In the full spectrum of evidence driven planning, design, operational and evaluation analyses – we are probably only producing about 15% (very rough estimate) of all the various traffic performance data that we consume/rely on and we typically find that we could use more information than what is available. Many decisions are necessarily based on “the best we’ve got” or instinct.

Q: In what format do you currently receive traffic count information from the Traffic Survey Group? What is the standard turnaround time for your requests? What improvements would you suggest for the delivery of this information to you (specifically ideas that speed up the process, leverage technology, make your work more efficient, etc.)?

A: Most of our references to the Traffic Survey group data are via the online (most current published year) County ADT maps (previously we relied heavily on the bound hard copy editions). Often we will request and secure other formats such as electronic spreadsheets/tables, etc. The file format that our firms utilize is associated with the JAMAR countboards and JAMAR Signal Warrant applications that are utilized (licensed) throughout NCDOT for Count Analysis, PC Warrants Signal Warrants & Multi-Way Stop Analysis and PETRA PRO packages.

Our turnaround time from Traffic Surveys depends largely on the availability of the information – if it is already collected and somewhat processed they are very responsive and try to meet whatever the situation dictates. However if the work requires collection and processing the turnaround is often controlled by the already scheduled commitments of Traffic Survey’s staff.

Several years back Mike Bruff utilized the intersection counts program for a PMP improvement proposal that indicated with adequate staff and improved technology (for ongoing collection, QC, and analysis & distribution) that we could lessen our reliance on contract counts. To date the turnaround time distracted by many traffic operational and safety studies and the lack of NCDOT staff and resources to perform this in house have kept us from pursuing this recommended model.

Q: In what format do you currently receive traffic count information from the consultants? What is the standard turnaround time for your requests? What improvements would you suggest for the delivery of this information to you (specifically ideas that speed up the process, leverage technology, make your work more efficient, etc.)?

A: Lisa and Jeff have the details for our limited Services agreement. I will defer to them noting that we receive good service and strong turnaround from the firms. We do have some periodic issues with QC, and expedite scheduling – but overall our experience with this has been positive. Efforts have been made through an internal process improvement effort that looked at cost containment and streamlining the count process. It is still a paper-laden process that would be a good candidate for additional automation w/web based tracking and accounting. Jeff and Lisa will have additional info from the internal process Improvement effort that was conducted. There may still be some real opportunity for more systematic collection of intersection count data – statewide – especially with tool such as linear

referencing And GIS for improved access and dissemination of this vital traffic information for decision making.

Q: What ideas do you have for improving the way traffic count information can be accessed by internal and external customers? Should counts collected by the various DOT units and consultants be captured and archived in a single database? What are the pros/cons to this idea? What amount of savings (rough estimate) of staff time and financial resources could be achieved?

A: Web and GIS Based – indexed and archived with historical information and seasonal info readily available – counts need to be viewed in ADT, peak hour & if available turning movement formats with all relevant info readily available PHF, truck percentages, etc. A central geographically referenced storehouse of count data would be desirable – however controls / disclaimers would need to be in place concerning the collection dates and nature of variability with counts – and the importance of considering major changes that may have already taken place prior to the “update” of the data. This tool should include the traffic volumes and vehicle mixes for Rail crossings as well. Volumes are such a basic and fundamental part of the transportation decision-making process that we do need to improve the timeliness, accuracy and accessibility of all of our traffic count information. I really need speed data also - hopefully some of the stations that are set up across the state could be configured to provide at least monthly summaries of volumes, vehicle mix and speeds – similar to the system that is on I-95 near Roanoke River (its accessible by IP).

Q: What is our section/unit spending on consultant services per year? Could any of this work be done with additional staff at the Division level, in Traffic Surveys or in another unit?

A: Defer to Jeff and Lisa and internal cost containment effort. We are utilizing our own forces for some peak collection (due mainly to critical time need) – we are also doing additional filtering./screening of count requests to make sure they are truly needed and that a surrogate source of information is not available.

Q: What are your suggestions (short and long term) for how traffic counts could be more efficiently or strategically collected? Do you think we need more permanent devices or more weigh-in-motion stations or should NCDOT move towards using portable devices?

A: On strategic corridors (Statewide Tier) I really feel that we need permanent multi-feature devices that will provide the 7/24 performance metrics for our transportation network - traffic volumes – by lane and direct, traffic vehicle mix (vehicle configurations by lane & direction), travel / traffic speeds (full report of max, min, 86%, pace, etc – by direction – possibly by lane), weight and size monitoring/surveillance/archival, video surveillance/monitoring, further out but possibly even emissions and sound monitoring.

On regional tier some of both – (portable & permanent) – on local predominately mobile – with some key fixed installations for vehicle weight sensing – possibly very simplified loading on beams measure for trigger of grossly excess weight -

Q: Do you have any other suggestions/improvements regarding the collection, delivery and use of traffic count information for NCDOT?

A: Improved use of technology and video methods, improved/required use of GIS Web based Interfaces – linkage of GIS & Photogrammetric – improved BUSINESS INVENTORIES INCLUDING Video Logs, Google map/Google earth Type tools, linkages with crash data - and migration away from paper intensive and manual intensive methods for processing and tracking count requests and delivery - additional QC measures and efforts for the data we are currently receiving and archiving.

Bad Count Data can affect every subsequent step and decision that is made on a project much in the same way as poor survey data can lead to plan errors and design failure. Count variability / travel variability is part of the system and as such the utilization of volumes will always have to be within the range of reasonableness and subject to dynamic influences. The better our information set on volume s and traffic is – the better our models and projections can be and the better our decisions can be that invest limited public funds to transportation needs.

INSERT CITY of FAYETTEVILLE and
DEBI HUTCHINGS comments and
Memo from FHWA holding NCDOT accountable for data gap analayis

<p align="center">Key/Critical Issues from RTEs/DTEs Quarterly Roundtable – May 22, 2008—clean up formatting</p>

Traffic Data Collection – TMT Work Stream Update – Alpesh Patel

- Traffic Surveys provides volumes on primaries and secondaries
 - Developers, municipalities, divisions, RPOs, also collect counts
 - A lot of counts are collected and maintained locally – would it be possible to centralize these counts within a database or some type of mapping software
 - Alpesh has been meeting with and interviewing various business units within the department
 - Alpesh has also met with the cities of Raleigh and Fayetteville
 - Communication issues – need to improve on sharing information
 - Division engineers received a survey from the TMT work stream
 - Will Beatty from FHWA has assisted in this endeavor
 - What would be the issues you would like to see addressed?
1. Standardized format – information from Traffic Surveys has to be typed in by hand, but information received from contracted firms is directly downloadable which saves time (sometimes Traffic Surveys counts the same location that we just had the firms count)
 2. Input into what time of year that Traffic Surveys performs counts (mainline counts – annually for most primaries and every other year for other primaries and most secondaries)
 3. Traffic Surveys should contact the divisions prior to performing any turning movement counts (these really need to be done when schools and/or universities are in session)
 4. Difficult to find data on the web (buried within sub-links)
 - Traffic Surveys generally has an idea of where and when they are going to make their counts (approximately 80% of their counts) – can we find out what type of count is being performed ahead of time?
 - Traffic Surveys generally does mainline counts (turning movement counts are a very small part of their work)
 - Seasonal issues are also important – especially along the coast
 - South Carolina has a web based traffic count application
 - Lisa Avery receives a box of turning movement counts from Traffic Surveys about every 3-4 months and then distributes them en mass to the DTEs and RTEs (we do not keep a copy) – can we get this more timely?
 - DTEs and RTEs keep counts locally – volume (numetrics, hi-star) and turning movements – can we get these and place them on the web?
 - Turning movement counts in TIAs – Jim Dunlop will be pursuing discussions with firms on providing turning movement counts performed as part of the TIA submittal (among other things)
 - Kent Taylor has concerns with counts performed by others
 - Traffic Surveys has manpower shortages
 - Count data fluctuates – what is the liability? (could be warrant and signal issues)

DIVISION SURVEY RESPONSES

Key/Critical Issues from Divisions Collected through Survey
--

Division 1 / April 22, 2008

Responsibilities for collecting traffic counts

- 1. What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**

Need for traffic counts come from public and local government requests for traffic signal or speed study investigations. Info can also be used for pavement designs when truck volumes are known.

- 2. Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**

For traffic signal requests, intersection counts are requested from Traffic Engineering and the PEF's that they have on Contract; for signal analysis, we ask for 16 hr counts and therefore order counts; getting counts for traffic signal analysis from Traffic Engineering Branch is SOP; for speed studies or adt needed for pavement design we use our own Nu-Metric Hi-Star counters to collect data given the short time frame and ease of use.

- 3. When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?**

Nu-Metric Hi-Stars

- a. Is this equipment sufficient for your needs, or is there a need to purchase more?
Sufficient

- b. Can this equipment be outfitted to communicate or stream traffic data wirelessly?
Not the model that we have and use, not needed since we are taking spot studies and return the next day or two to remove counters

- c. What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)
We are interested in ADT, type of vehicles and speed primarily for traffic studies. Truck data collected would be helpful for pavement design.

- 4. How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**

Counts usually stored on laptop used to download information from Nu-Metric counters, only distributed in house to those requesting

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

1. From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source. Would be a very good tool/ resource to have traffic count and vehicle class information, but must be kept up to date. Keeping speed data may not be good because it is dependent on many variables such as weather, congestion, etc and therefore open to much interpretation by the public. Speed Data may only be good for internal use only. Public wants real time data which current AADT maps do not provide.
2. How should NCDOT provide travelers with more **real time** info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?
Install more permanent count stations
3. How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?
A network of counters at strategic locations on the statewide tier

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: Staffing is probably the biggest challenge. Many devices need constant attention and maintenance to be real time effective.

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: Do not see much benefit for this in Rural areas, however Urban areas may have more need for such services and there may be cost sharing opportunities or collaboration to share traffic data from services provided by those outside of NCDOT.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

Responsibilities for collecting traffic counts

1. What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?

One of the main reasons for getting counts is to conduct Traffic signal studies. These counts are 16 hour turning movement counts conducted at a specific location which are then used to conduct engineering evaluation. Sometimes these type counts are also done as part of a Traffic Impact evaluation for new development or proposed improvement project. We also get ADT volumes which are used for recommending improvements associated with new development (turn Lane addition) or development of roadway improvement recommendations.

We also utilize traffic counts on DDC/DDC project Planning.

2. Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?

We use both methods. If we only need for a couple hours (usually peak periods) then we may do counts using division personnel. If needed full 16 hour count then send request for contract count done by Traffic Engineering's contract consultants. For ADT we either get off map or use our own tube or Highstar counters to get those that are not available. We also use the Highstar counters to get speed data.

3. When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?

We have 1 – Jamar DB-100 & 1 – DB400 counter boards, 3 – Nu-metrics NC97 highstar counters, and 4 – Jamar Trax Flex HS tube counters

a. Is this equipment sufficient for your needs, or is there a need to purchase more?
Need to get more Nu-metrics counters. Would like 5 more.

b. Can this equipment be outfitted to communicate or stream traffic data wirelessly?
I don't know, but unlikely.

c. What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)
The Nu-metric NC97 and Jamar Trax Flex are used to get vehicle Speeds, headway, and gaps in addition to volume.

4. How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.

We currently store both ways, electronic to download into software for analysis and paper copy in file for location. Counts done by us are not shared except with parties involved in study. Counts received from Traffic are shared but not aware of any data base that stored were and when counts have been done.

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

1. From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would

reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.

Pros – this could help reduce duplication and provide central location to review to determine if counts are available and get needed info.

Cons – data entry could be time consuming. For external info could be confusing and incorrectly interpreted and lead to wrong public information.

2. How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?

This is difficult, first need to evaluate what info is most helpful. Providing too much or unrelated info does no good. Methods can be issue also, cell phone usage and driver distraction. Should info be route specific which then could be provided by VMS.

3. How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?

Need to determine parameters for installation and use for both types with specific goals as to what it is to accomplish and use of info provided by both DOT and driver. Drivers must be able to exercise options when info is provided, otherwise it's worthless. (example: does no good to advise about congestion, delay, or speed if the route they are on is only one.)

More of these decisions should be made at the division level.

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: Funding and staffing are going to be primary issues.

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: With local governments this would increase the size of data pools with them providing data they gather as well. We already are using PEF's to conduct turning movement counts.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

A: One of the big issues will be the ability to search and retrieve information. This will include distribution of software to open and use information. Electronic data may need to be stored in more than one format to meet need of various users.

Allow more user interface at the operations level.

Responsibilities for collecting traffic counts

1. **What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**
 - Citizen Requests or DOT investigations for installation of new signals in order to perform signal warrant analysis. Investigations for signal phasing changes, specifically protected left turn movements.
 - Counts for potential work zones and lane restriction times
 - To plan improvements to heavily congested areas, possibly do some modeling to recommend traffic operation improvements
2. **Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**
 - For all investigations for new signals we request 16 hour counts through the Regional Traffic Engineer/Traffic Engineering.
 - For signal phasing change investigations, we collect our own counts, primarily in the peak hours.
 - Traffic control and congestion studies, own forces.
3. **When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation? Nu-metrics and Jamar Technologies Manual Traffic Counter.**
 - a. Is this equipment sufficient for your needs, or is there a need to purchase more?
 - i. Our equipment is fairly old (maybe 10 years old, some 5 years old, some 1 year old) and we have need to replace some of the equipment every few years
 - b. Can this equipment be outfitted to communicate or stream traffic data wirelessly?
 - No, not our current equipment, data must be downloaded to a computer
 - c. What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)
 - ADT , Speed, 85th percentile speed, vehicle type, headway gap
4. **How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**
 - Primarily paper copy (however, electronic format is also saved)
 - No, count information is not currently being shared with anyone except for an MPO or City/Town within the Division

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

1. **From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**
 - This would be a great benefit – Cost savings, time savings, etc.
 - The only con would be the keeper of the data base and the techniques of gathering all the data available by the divisions, private engineering firms, central unit.

2. **How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?**
 - With a user-friendly interface on ncdot's website that utilizes mapping along with access to data at a subject roads. Example: Google maps integrated with the information that would be input into any central database with a GIS/mapping interface that is implemented by DOT.
 - Some ideas I have heard of from other states and countries are streaming video on news channels, information directly to "smart cars", that can react and help drivers make choices on alternate routes and speeds, lane and speed control in congested areas, DMS, radio networks with 24/7 traffic info. Cell phones, etc. are definitely means to communicate this info. Someway to link this information to TIMMS would be good. The wildest thing I have seen is the interactive video at the CATT Lab, University of Maryland, where all the sensor information from around the DC, Baltimore Metro area is captured by one site and you can zoom in to a 3-D landscape like Google Earth and see speeds, congested areas, all real time. Very Cool. It was still prototype in November of 2007, but hoping to be more public availability in future.
 - Thought to follow up on earlier question, is how to make this work. A joint effort with a university with allot of cheap graduate help to filter, screen the data, convert to a common format to make it available for different entities would be a good idea. Have many major universities in this state. Good partnership of resources. NCDOT provides data and funding, they provide brain power and state of the art techniques to get information to the public.

3. **How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?**
 - I think you are going to have to use some type of congestion threshold to evaluate the cost effectiveness. Density is most reliable, but difficult to measure. Avg. Speed, travel times, V/C Ratio

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: Some of all. I think the biggest hurdle will be finding a champion and that the department as a whole from top to bottom, make a commitment that operation of an existing roadway and improving its efficiency is just as important as cutting the ribbon on a brand new facility. Operation of a system has to have the same time, effort, funding, planning, etc. as a major TIP project up front. Travel time reliability has to be a major component of our strategic planning process. **The second goal of our new mission statement!**

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: Both local government and PEF's have traffic count data that is likely not currently being shared and available for use by others. Specifically, TIA's require peak hour counts at intersections which would be a valuable resource if the info. could be captured and published.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

Responsibilities for collecting traffic counts

- 1. What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**

Citizen's request for certain types of studies. Determining speeds, volumes, etc. Used as part of speed zone studies, protected left turns studies, turn lane studies, etc.

- 2. Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**

Counts are requested through TEB (TEB has contracted with PEFs to conduct traffic counts) for intersection counts.

We perform small counts (ie. Only one or two lanes need to be counted).

- 3. When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?**

We use Nu-Metrics counters.

- a. Is this equipment sufficient for your needs, or is there a need to purchase more?**

We have an adequate supply for what we do. Could possibly use a few more.

- b. Can this equipment be outfitted to communicate or stream traffic data wirelessly?**

Uncertain. Would have to contact distributor or check website.

- c. What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)**

Speed, headway, road temp, ADT, vehicle classification, peak hour, 85th percentile, etc.

- 4. How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**

In house counts stored electronically. Not shared unless requested.

Counts from TEB stored in paper format. RTE also receives counts. Unsure if TEB shares counts with others.

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

- 1. From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**

Pro: good concept
Con: logistics

2. How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?

TIMS provides info on the web
511 provides info via the phone
DMS provide info on the roadway

3. How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: All of the above – financial, staffing and technology

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

Responsibilities for collecting traffic counts

1. **What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**

The purpose of the counts is to determine the most recent ADT's and speed data to make decisions on responses to citizens' requests and to use when evaluating developer reviews.

2. **Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**

We request 16 hr. turning movement counts from PEF's thru TEB, and we collect volume and speed data in house, as needed.

3. **When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation? NuMetrics Counters**

- a. **Is this equipment sufficient for your needs, or is there a need to purchase more?**
We could always use more equipment.

- b. **Can this equipment be outfitted to communicate or stream traffic data wirelessly?**
I'm not aware that the equipment we use can be used wirelessly.

- c. **What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)**

Speed, vehicle length, weather and pavement conditions

4. **How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**

Primarily paper copies

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

1. **From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**

A pro would be that central and external units could access the information. A con would be that counters, either PEF's or divisions may be required to process and distribute additional information. This could possibly put a strain on resources.

2. **How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?**

Utilize additional ITS devices to convey info to motorists.

3. How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?

Peak traffic volumes and incident occurrence rates could be used to determine proper locations.

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: It's difficult to provide real time traffic management to motorists for many reasons. Locally we experience typical peak hour delays on the same routes everyday. The most severe traffic management challenge we face is during a large incident, for example on Interstate 95. Incident detection is difficult, then incident removal can be an issue. Ideally, outside response agencies that are first to arrive on scene could significantly reduce impacts to traffic with proper incident management techniques.

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: As noted above, additional cooperation from, or education of, outside response agencies, (fire, rescue, law enforcement) could have an impact on traffic management. One example could be to use private resources to detect, coordinate and remove incidents.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

Responsibilities for collecting traffic counts

1. What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?

- Traffic Department: Request of speed study, traffic signal and vehicle restrictions are several items that trigger traffic counts. We use the counts to determine the average speed of 85th percentile, the type of vehicle and to assist in determining if a signal is warranted.
- District 2: To verify ADT for Commercial Driveway Permits.
- District 3: Used for rating unpaved secondary roads.
- TMC: Our Unit does not collect traffic counts, however, we have used them in the past for determining areas to extend IMAP services.
- Division Operations Engineer: Traffic counts are obtained for traffic investigations relative to the need for traffic signal and four-way stop control.

2. Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?

- Traffic Department: We collect counts and order counts from the Regional Traffic Engineering Office. Counts ordered from the Regional offices are typically 16 hour turning movement counts. In house counts are typically peak hour counts. We currently do not use PEFs to do counts.
- District 2: We use our own tube counters.
- District 3: Both – depends on size and scope of count required.
- Division Operations Engineer: The type of request received dictates what type of count is needed and where it is requested

3. When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?

- Traffic Department: Nu-Metrics, Jamar Traffic Counter.
- District 3: Traffic Tally 2.

a. Is this equipment sufficient for your needs, or is there a need to purchase more?

- Traffic Department: Yes.
- District 2: We use our own tube counters; they seem to be adequate.
- District 3: Would benefit significantly from at least two (2) more.

b. Can this equipment be outfitted to communicate or stream traffic data wirelessly?

- Traffic Department: No.
- District 2: No.
- District 3: Do not know.

c. What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)

- Traffic Department: Weather conditions, type of vehicles (length).
- District 2: Counts only.
- District 3: None.

4. **How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**
- Traffic Department: Counts are stored electronically and by paper copy. We share our counts within the Division office, District office and Regional office. We provide the electronic and paper copies of the recorded counts.
 - District 2: Paper only.
 - District 3: Paper copy format – shared with maintenance camps.

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

1. **From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**
- Traffic Department: Pros – Having a central database with current information would provide us the information required to finalize decisions related to speed study (reduction), signal warrants and vehicle restrictions at a much faster pace than the current four to six weeks we now need to complete a study.
 - District 2: A central database would be helpful. The maintenance of the database would be a challenge.
 - District 3: As long as Departments collecting counts have access to update and maintain, it can only be beneficial.
 - TMC: It would be a good idea to store this type of information in a central database. This would make it easier to retrieve, whenever the need arises.
 - Division Operations Engineer: Need to separate into historical and real-time data.
2. **How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?**
- Traffic Department: We could utilize the DMS board along the highways. Also use the vehicle's GPS units.
 - TMC: By installing traffic detectors/sensors.
 - Division Operations Engineer: Consider 511 and in-vehicle navigation systems.
3. **How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?**
- Traffic Department: The detection devices should be placed on the heaviest traveled highways, preferably interstates and major US routes; routes that have a history of accidents. Urban areas should also have the detection devices.
 - District 3: They should be placed in known areas of congestion to aide the traveling public in avoiding these areas during peak traffic times.
 - TMC: By locating the areas that have high traffic volumes and accident rates. These detection devices should be located in areas where existing or proposed cameras or DMS signs are installed.
 - Division Operations Engineer: Consider urban areas with current ITS devices.

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

Answers:

- Traffic Department: Having the staff to maintain a GIS/mapping interface with current data would be a challenge.
- District 3: Having an adequate and knowledgeable staff along with state of the art technology can only be achieved if proper financial support exists.
- TMC: From an ITS perspective, one of the resource challenges is the availability of fiber, which is an important communication link in obtaining traffic data (cameras).
- Division Operations Engineer: Need for infrastructure to include detection systems, TMC operations and web-based operations.

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

Answers:

- Traffic Department: Several local governments are not staffed with traffic personnel. The cost of partnering with the private sector could be very expensive.
- District 3: NCDOT would benefit from the assistance provided, level of knowledge provided and cost sharing by all agencies involved.
- TMC: Partnerships with other outside agencies is beneficial because these agencies can help disseminate this information (camera images) through local government and public TV channels.
- Division Operations Engineer: If public/private partnership, the use and ultimate control of the data is a major issue. The installation of devices and systems within the highway control of access is also an issue.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

Answers:

- Traffic Department: Continue to work towards integrating traffic data management and the ITS group. Install more cameras and DMS.
- District 3: I would recommend polling the traveling public as that is initially who the information is for.
- Division Operations Engineer: Can SmartLink assist the management of the data?

Responsibilities for collecting traffic counts

1. **What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**

Counts are gathered for the following uses:

- Verification of vehicular trips for road additions
- Verification of traffic volumes in an area for issuing driveway permits
- Justification of safety upgrades (guardrail replacement, traffic signal warrants, traffic signal modifications, lane additions, etc.)
- Determining truck percentages
- Requests from outside sources

2. **Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**

Division 8 performs traffic counts in house and also requests counts from the Traffic Engineering Branch. A traffic count is requested from the TEB if specific turning movements are required.

3. **When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?**

- Tube counters
- Nu-Metric data collectors

- a. **Is this equipment sufficient for your needs, or is there a need to purchase more?**

Additional counters utilizing the latest technology would be beneficial.

- b. **Can this equipment be outfitted to communicate or stream traffic data wirelessly?**

The Nu-Metric data collectors have the capability to wirelessly transmit data.

- c. **What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)**

The Nu-Metric data collectors are capable of collecting the number of vehicles, vehicle speed, vehicle classification, headway gap, road temperature and condition (wet or dry).

4. **How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**

- The Nu-Metrics data can be stored electronically and printed. The data is shared with other units within the Division via paper copy or electronically via e-mail.
- Tube counter data must be manually transferred to another medium (Word document, spreadsheet, etc.)

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

1. **From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**

Pros

- Easier access to information for NCDOT employees and other entities
- May reduce outside requests on local offices for data
- Encourage continuity state wide for speed zones, road improvements, etc.
- Possible reduction in local filing space if data maintained in central location

Cons

- May require additional training
- Difficulty of data transfer from local offices to central location
- Network dependability
- Making the system user friendly

2. **How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?**

511 and TIMS have proven themselves to be effective when information is updated quickly and accurately, however, this information only reaches a small percentage of motorists and requires the motorist to initiate the request to receive the data. Providing travel times and other pertinent information on overhead message signs seems to be an effective tool to directly reach the motorist and does not require the motorist to request the information. As technology advances, the ability to send pertinent information directly to motorists will need to be explored.

3. **How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?**

The need for portable and permanent devices should be evaluated on a case by case basis by individuals familiar with the area and its needs.

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: NCDOT faces financial, staffing, and technological challenges for the majority of its current operations and programs. Any new programs will require additional funding and staffing and/or contracting to allow for continuation of day to day operations. To aid in decreasing the learning curve, NCDOT should work with FHWA to determine what best practices have been developed by other states and/or countries.

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: Partnerships with local governments are necessary to provide comprehensive traffic data services to the motoring public. Data for municipality maintained roadways is needed in conjunction with state maintained roadways.

Partnerships with the private sector are necessary since, unlike large government agencies such as NCDOT, private firms have the ability to keep up with the latest technology and innovations. Partnering with the private sector also provides an alternative to addressing staff shortages.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

A: Having traffic data more accessible to the public and other interested parties (via an online website, local NCDOT offices, or a central location) and providing innovative ways to get travel information directly to affected motorists would be beneficial to all parties. As mentioned previously, working closely with the FHWA will allow NCDOT to take advantage of lessons learned by other states and/or countries.

Responsibilities for collecting traffic counts

- 1. What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**

The need for traffic counts is primarily for the purpose of determining if a location warrants a signal. Counts are also done to determine if protected left turns are needed for an existing signal.

- 2. Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**

We typically only do peak hour counts ourselves. We get traffic engineering to do a count if an intersection is more complex (multiple thru lanes, dual lefts and right turn lanes) or if we feel a peak hour count is not all that is needed.

- 3. When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?**

JAMAR turning movement counter for intersection counts where turning movements are needed and Nu-Metrics counters when just an ADT is needed. Nu-Metrics counters have been used for turning movement counts on some occasions.

- a. Is this equipment sufficient for your needs, or is there a need to purchase more?**

This equipment has been sufficient.

- b. Can this equipment be outfitted to communicate or stream traffic data wirelessly?**

No.

- c. What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)**

Nu Metrics - Speed, temperature, dry/wet condition, vehicle classification

- 4. How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**

Counts stored electronically. We have been asked by other business units to conduct counts but rarely have been asked for existing data. The data is available for anyone should they need it.

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

- 1. From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**

Pros – this would be a great tool to allow us to access data. This would also allow us to determine if a count has been done recently at a location and not perform or request a new one unless more recent data is needed.

2. How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?

The information should at least be made available on the web. If possible make it to where people could have the information sent directly to their mobile devices.

3. How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?

Higher volume corridors should receive items first.

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: None, we could do this in-house with existing resources

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: Ask private sector to provide their count information electronically, and potentially make it available on our web site.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

A: Should develop or identify existing standard format for data. Assign one unit to ensure incoming data meets standard format, then post to web.

Responsibilities for collecting traffic counts

1. **What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**

Needed to determine road/lane closures for time restrictions on projects.

2. **Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**

Traffic Engineering

3. **When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?**

Traffic Engineering collects

- a. Is this equipment sufficient for your needs, or is there a need to purchase more?
 - b. Can this equipment be outfitted to communicate or stream traffic data wirelessly?
 - c. What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)
4. **How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

1. **From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**

The easier it is to access data the better. Even if the data is aged a little it still is better than none.

2. **How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?**

We don't need to get consumed with providing excessive data to travelers. They want to know if the route they are travelling is open and traffic is moving steady at a reasonable speed.

3. **How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?**

Needs to be part of a strategic plan to benefit the most travelers, and due to financial considerations it needs to be low maintenance and it does not need duplication for the same travelers.

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: The technology is probably available, but we must determine if the financial and personnel resources that are needed is our best use of those resources. Data for the sake of data does not move traffic. Most people want to be able to travel without having to think and analyze too much. They want to be alerted if something is going to impede their travel significantly, they don't necessarily want every detail – just options.

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: As long as the data collection and the form in which it is presented is standardized it should be beneficial.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

Division 12

Responsibilities for collecting traffic counts

1. **What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**

Primarily traffic signal studies, turn lane warrant studies and spot speed studies. This data is essential to performing traffic engineering studies requested by the public and developers.

2. **Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**

We order the counts from Raleigh if needed. Most often we may do in house peak hour counts and then order additional counts if needed or if the volumes are known to be high initially. Personnel is an issue also in doing the in house counts.

3. **When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?**

Nu-Metrics Hi-Star Model NC-97

- a. **Is this equipment sufficient for your needs, or is there a need to purchase more?**
Currently, it suffices for the number of counts we have been performing.
 - b. **Can this equipment be outfitted to communicate or stream traffic data wirelessly?**
Not to my knowledge
 - c. **What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)** Speed primarily.
4. **How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**

The counts are stored electronically and can be shared if needed by other units.

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

1. **From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**

Negatives would be collecting the data and inputting into the database and funding. The positives would be having access to this data for many uses.

2. **How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?**

DMS signs and 511 seem to work well but not all travelers have PDAs or cell phones and maybe in street or out of street detection.

3. How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?

Based on past historical data of incidents, crashes, delays, etc. along with volume.

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: With present staff and funding it would not be possible to collect necessary data and to install new traffic management devices.

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: Input from the private sector may be useful in determining locations and types of ITE devices needed.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

A: Computerized signal systems where applicable and possibly more DMS signs.

Responsibilities for collecting traffic counts

1. **What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**

Triggers are mostly requests for intersection studies
Used for signal and intersection studies

2. **Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**

We order counts if we need turning movements. Otherwise we conduct in-house

3. **When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?**

Nu-Metrics

- a. **Is this equipment sufficient for your needs, or is there a need to purchase more?**

We could use a few more.

- b. **Can this equipment be outfitted to communicate or stream traffic data wirelessly?**

No

- c. **What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)**

Speeds, truck percents

4. **How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**

Electronic and paper. The reports are shared thru the division with any unit that has an interest – usually the district office

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

1. **From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**

I believe the public could use the data. It may open the door to more legal and court involvement to testify on this info.

2. How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?

511

3. How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?

Unsure

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: Staffing, ease of viewing the information

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: Not – this needs to be NCDOT only. The gathering of data can certainly be from the private sector.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

A: unsure

Responsibilities for collecting traffic counts

- 1. What triggers the need to collect traffic counts? What is the primary purpose of the counts you collect, i.e. how are they used?**

- a) Design data for roadway/intersection projects by Division Design & Construct unit (DDC)
- b) Traffic turning movement counts used to evaluate need for traffic signals, roundabouts.
- c) Volumes (AADT) needed to prioritize Secondary Road improvements
- d) Division Traffic Engineering collects primarily speed data for speed zone studies.

- 2. Do you collect counts or request assistance (from either Traffic Engineering or from Professional Engineering Firms (PEFs)? If both, how do you determine when to order vs. collecting in-house? How do you decide between PEFs vs. Traffic Engineering assistance?**

All of the above. Division Traffic Engineering can capture lane volumes, speeds, vehicle classification, and does so for Division Traffic, DDC, and Division Maintenance. Division Traffic Engineering requests turning movement counts through the Traffic Engineering Branch which in turn provides a count performed by a PEF. Deciding factor is multiple movements (use TEB/PEF) or single movements (use Numetrics by Division Traffic).

- 3. When you collect in-house what type of equipment (ex. Nu-Metrics) is used to conduct your field investigation?**

Nu-Metrics

- a. **Is this equipment sufficient for your needs, or is there a need to purchase more?**
Sufficient
 - b. **Can this equipment be outfitted to communicate or stream traffic data wirelessly?**
Our models don't, but our understanding is that some Nu-Metrics models can.
 - c. **What other information is this equipment used to collect besides counts (speed, headway gap, road temperature, etc.)**
Counts, speed, and classification by length.
- 4. How are the counts stored (electronic or paper copy format)? Are they shared with other business units in the organization? If so please name those units and the method by which you share the info.**

Counts are downloaded and are in electronic format. They are usually printed by Division Traffic Engineering for reports to other units (DDC).

Ideas for improving the way NCDOT capture, publishes, and distributes traffic count information

- 1. From your perspective what are the pros and cons to building a central database with a GIS/mapping interface that ALL traffic count, speed info, vehicle class info, etc would reside? Internal (and eventually external) users could pull latest (and historical) traffic related information from this source.**

Pros would be accessibility and availability. Cons would be figuring out if the needed data is in the database, and educating potential users that the database exists. Any new way of getting count data would need to be perceived as easier, quicker, and more efficient, than the old way.

2. How should NCDOT provide travelers with more real time info on average speeds, volume, congestion levels, etc to the web, PDAs, cell phones etc?

Websites that show real time spot travel conditions are nice. NCDOT has done this before, and if the data was viewed before a trip, it could be beneficial. Supplying information to PDAs and cell phones should NOT be done by NCDOT, as drivers would attempt to use these devices while driving, and drivers are already too distracted. If PDAs and cell phones could have blockers that would make these features non-functional at speeds above 5 miles per hour, it would be safe to provide the information that way.

The best way to provide real time travel information is highway Dynamic Message Signs. Messages such as "The speed of traffic beyond the next exit is XX miles per hour", or like the Georgia DOT uses in the Atlanta area, giving the travel time to upcoming exits, and giving the distance to those exits. They are don't like to admit that the speeds are 25 mph above the speed limit, however, so some of their messages are too general.

This information could also be put on Highway Advisory Radios. It could also be made available to commercial radio stations, especially when an incident happens and travel speeds become near zero.

3. How should NCDOT make the best decisions on deploying detection devices (portable vs permanent) and where should those devices be strategically placed today and into the future?

This would require some type of planning analysis. The highest volume roads, Tier I / Strategic Corridors, are primary candidates.

Q: From your perspective what resource challenges (i.e., financial, staffing, technology) does NCDOT face to elevate the importance of better traffic data management?

A: Before such a study (3. above) is undertaken, an educational effort should be undertaken. Engineers and planners need to know what technology can do, and have demonstrated what the benefits and uses of the captured information could be. We need to know what the realm of "traffic data management" means. To me it's broad, everything from long range planning to real time incident management. It may not mean the same thing to everyone taking this survey.

Q: How could NCDOT benefit (or not) from additional partnerships with local government and the private sector to provide traffic data services?

A: We need to identify stakeholders: potential beneficiaries and end users of this data. The better the capabilities are understood, the more interest there could be in improving and using better managed traffic data.

Q: What other best practice efforts should NCDOT consider for improving how traffic data is managed?

A: I may not know enough about this field to know what best practices have been tried or are in place. Certainly there is potential for improving the dissemination of real time traffic data, for traffic management reasons. The efficient identifying and collection of needed count, speed, and classification data for

planning purposes is already good, to my knowledge, but based on new technology and DOT needs, maybe large improvements are possible with an investment of time and funding.

RESEARCH AND NATIONAL BEST PRACTICE

Research Findings Traffic Data Management/Florida DOT/3/31/08

Provide Links, front page of the website and links to associated reports/findings here

Provided a copy of Florida's Traffic Monitoring Procedures (can be found in TMT directory)

Contact Person:

Rick Reel

Transportation Statistics Office

605 Suwannee St. MS27

Tallahassee, FL 32399-0450

PH: 850-414-4709 FAX: 850-414-4878

EMAIL: richard.reel@dot.state.fl.us

Provide Summary or Key Findings that are applicable to the Traffic Counts/Traffic Data Workstream here

- Central statistics BU that houses all the traffic data in an Oracle mainframe database that Districts load data into. Have limited control on database...some info is closed, some is open. Agreed others will have problems using the data freely because they wouldn't understand the data.
- ATRs (ADR 3000) are more accurate and should be the backbone of any traffic data system (have approximately 300) and are used to develop growth factors
- Portable systems are used by Districts on an as needed basis for additional counts
- Traffic Operations does some of their own counts at intersections
- Data customers could include real estate community, pavement design, transportation planning
- Frustrated because they have spent \$ putting in ITS Systems and the ITS folks are not sharing that information with planning
- Count every state road per year
- Do annual data processing for yearly counts that takes approximately 2 ½ months to do

Research FindingsTraffic Data Management/Georgia DOT/3/31/08

Provide Links, front page of the website and links to associated reports/findings here

<http://www.dot.state.ga.us/statistics/TrafficData/Pages/stars.aspx>
<http://www.fhwa.dot.gov/ohim/tmguid/index.htm>
<http://www.fhwa.dot.gov/index.html>

Contact Person:

Mrs. Catrice Brewer

QA/QC Data Manager

Georgia Department of Transportation Data

5025 New Peachtree Road

Chamblee, GA 30341

office: 770-986-1436 or 1437

fax: 770-986-1139

EMAIL: cabrewer@dot.ga.gov

Provide Summary or Key Findings that are applicable to the Traffic Counts/Traffic Data Workstream here

- Central statistics BU that houses all the traffic data in an Oracle system that is web based (see first link above). Agreed others will have problems using the data freely because they wouldn't understand the data.
- ATRs (ADR 3000) are more accurate and should be the backbone of any traffic data system (have approximately 260)
- Portable systems are used on an as needed basis for additional counts, to verify counts (have approximately 17,000??)
- Data customers could include real estate community, air quality control, transportation planning
- Only count 1/3 of locations per year (3 year cycle), estimating the remaining data
- Strongly suggest documenting processes and procedures

Research FindingsTraffic Data Management/Missouri DOT/4/x/08

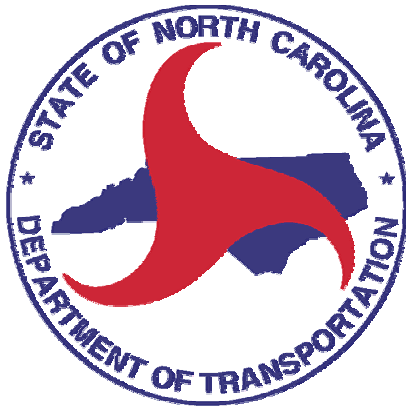
Provide Links, front page of the website and links to associated reports/findings here

Contact Person:
Mary Beth Anthony
Planning Supervisor - Analysis & Reports
Missouri Department of Transportation
MaryBeth.Anthony@modot.mo.gov
573.751.3702

Provide Summary or Key Findings that are applicable to the Traffic Counts/Traffic Data Workstream here

- Permananet Sites: Speed, Class, Volume - Peek ADR 3000 , HD Wavetronix, Peek Axle Light
- WIM - IRD 1068 and 1 iSINC
- Portable Counters: Road Tubes, Class, Volume: Roadrunner (by Roadway Data), ADR 1000
- Use TRADAS (by Chapparal) to generate our annual growth factors. The year-end data is then placed in our Transportation Management System, an Oracle-based relational database, for our MoDOT user community to access.

Traffic Counts / Traffic Data Management



TMT Workshop
July 23, 2008

- Workgroup team
- Why Conduct this Workstream?
- Hypothesis
- Approach
- Facts and Findings
- Recommendations
- Next Steps

Workgroup Team

- Alpesh Patel – TMT Lead
- Meredith McDiarmid – Work Zone Traffic Control
- Will Beatty – FHWA
- Other Key Workstream contributors
 - Traffic Survey Group (Transportation Planning Branch)
 - Traffic Forecasting Units (Transportation Planning Branch)
 - Traffic Engineering and Safety Systems Branch
 - ITS Operations Unit
 - Division Traffic Engineers / Regional Traffic Engineers

Why Conduct this Workstream?

- Result of Department-wide “Bottoms Up” evaluation – November 2007 to January 2008
- **TIMELY DELIVERY of PROJECTS**
 - ◇ Project level forecasting
 - ◇ Critical path for TIP projects
 - ◇ Controlling factor in highway and pavement design decisions
 - ◇ Supports transportation planning and Air Quality conformity
 - ◇ Reporting data to Feds and Fed \$ in balance
- **REAL TIME MOBILITY CONDITIONS**
 - ◇ Corridor mobility and congestion measures (local & statewide)
 - ◇ Streaming volume and average speed info to customers

Hypothesis

- To identify a more strategic approach to managing traffic data and count collection services statewide.

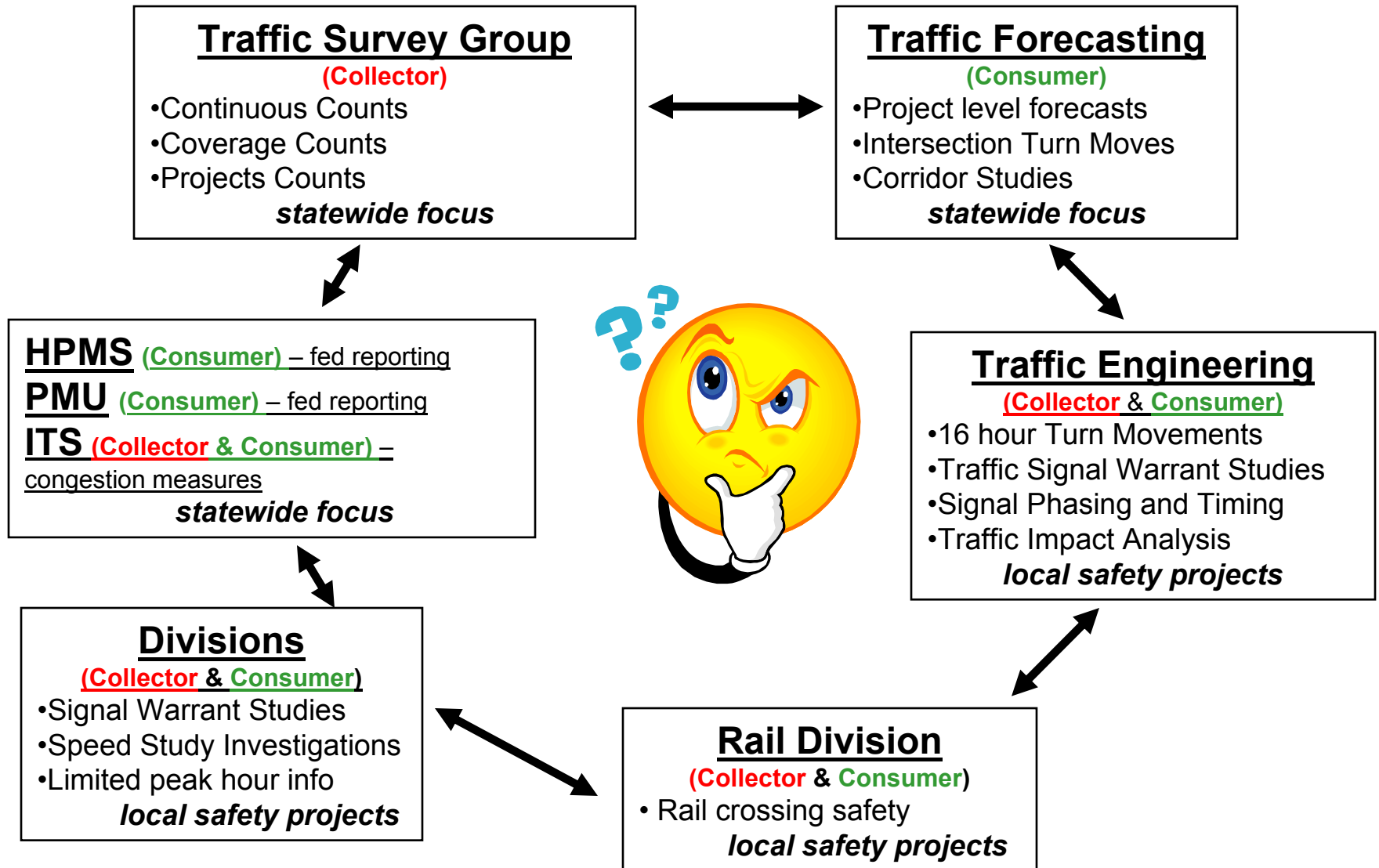
Analysis included:

- improved collaboration of various BU's that either produce or need the data. consideration of a plan to govern long term decision making on the placement, use, collection & dissemination of traffic data
- use of technology to stream information in real time to internal and external customers. Storage and maintenance of data in a single database with mapping interface
- shared use and communication capabilities of equipment

Approach – March to June

- Stakeholder Interviews
 - Traffic Engineering, Traffic Surveys, ITS, Work Zone Traffic, Forecasting Unit, GIS
- National best practice research
 - Iowa, Illinois, Georgia, Florida, New York, Wisconsin, South Carolina
- Survey to all 14 Divisions
- Field trips to Division 6 and 2 municipalities
- Quarterly roundtable with Regional and Division Traffic Engineers
- Resources referred to:
 - Mike Bruff PMP paper (1999)
 - Traffic Monitoring System (Dec 03)
 - Recommendations for Obtaining Cost Effective Counts (Feb 07)
 - FHWA Traffic Monitoring Guide
 - AASHTO guidelines
 - Articles on Traffic Flow technology

Facts and Findings – Collectors vs Consumers



Facts and Findings – Common Themes

- **Isolated approach to count collection in NC**

- 1) Data is stored “locally” and
- 2) Counts are used for different purposes
 - ◇ Traffic Survey Group
 - ◇ Traffic Eng and Safety Systems
 - ◇ 14 Divisions
 - ◇ Rail Division (8000 crossings)
 - ◇ ***Developers/consultants***
 - ◇ ***MPOs/RPOs***
 - ◇ ***Municipalities***

- **Unplanned Work / Delivery issues**

- Duplication—2 different groups collecting counts in same location, one week apart
- Some elements of current model are more “reactive” than proactive
 - ◇ No pattern of seasonal work that can be managed and evened out
 - ◇ 8-10 weeks to turn around TM request; 5-10 months on project level forecast

Facts and Findings – Common Themes

- **More permanent devices OR use vehicles as “traffic probes” (GPS technology) OR both?**
- **All count info (and history) in one location / view from one map**
 - Easy access from DOT website
 - Search and sort capabilities
- **Shared resource and asset issues**
 - Use of equipment for both mobility measurement & project level work
 - Use of PEF's may alleviate workload burden
 - Only 17 of 45 WIM stations in NC are operational

RECOMMENDATIONS - *Summary*

Establish a better **OPERATING MODEL**

- Multiple units vs single program management
- Create a clear, visible **POLICY** for managing Traffic Count Program
 - Standards, guidelines, criteria for QA/QC, and customer expectations
 - Scrutinize need of traffic count requests
 - Hold BU requesters accountable for decision making
- Build count **REPOSITORY**; make data accessible via web
- Determine **BEST USE** of traffic related devices/technology within 3 Tiers
 - Coordinating equipment specs and purchase
 - Leverage technology to stream info to customers
- Hold Workshop (July 23) to share concept / determine “hows” of implementation

Recommendations – NEW Operating Model

Single Program Management for Traffic Count Collection

Accountability:

- ***ownership, QA/QC, & sharing of data*** -
- ***strategic oversight and use of traffic related equipment*** -
- ***standards and customer expectations*** -
- ***central database with access via web***

**** Utilize
1) PEF's &
2) Division staff
to help manage
workload***

Continuous Counts
Coverage Counts
Project Counts
Counts for special studies /
research projects

8, 12, & 16 hour
Turning Movements

Rail Crossing Safety counts
Passenger counts for Ferry vessels
Passenger counts for Transit services

Consumers

14 Divisions

(Collector & Consumer)

- Signal Warrant Studies
- Speed Study Investigations
- Limited peak hour info
local safety projects

Recommendations – Short Term

Formalize Roles & Responsibilities

- Develop Statewide Traffic Count Management POLICY
 - Identify role, responsibilities & shared metrics under NEW Operating Model
 - Establish clear guidelines and standards
 - ◇ Review any current policies and
 - ◇ Clarify who, when, where, and how count data should be collected, stored, & shared
 - Identify customer expectations and clear purpose and need for count request
 - ◇ Quality of data
 - ◇ Turnaround times
 - ◇ New rules/criteria to determine if count request is even necessary
 - * Ex. Extraneous intersection counts on bridge forecasts
 - ◇ Scrutinize forecast request
 - * Simple bridge forecast—use trend line analysis
 - * If it requires a model then go to Transportation Planning
 - ◇ Biggest requesters currently are:
 - * PDEA
 - * Feasibility Studies
 - * Divisions
 - * Consultants

Recommendations – Short Term

Formalize Roles & Responsibilities

- Develop Statewide Traffic Count Management POLICY (con't)
 - Determine IF service priorities are necessary – what counts should be collected first and why?
 - ◇ Review Federal/state requirements
 - ◇ Service priorities for individual BU consumers VS. priorities that move DOT dashboard gauges
 - * What to do when these priorities conflict?

Recommendations – Short Term

Plan Your Work...Together!

- Develop Statewide Traffic Count Management POLICY (con't)
 - Develop and post annual work plan
 - ◇ Share customer needs and requests
 - ◇ What locations will require counts (and what type)?
 - ◇ Determine how to use PEF's/Division staff to balance workload and set milestones for timely delivery to customers
 - ◇ Start with supporting *Proof of Concept* projects in TIP Delivery workstream
 - Review all contracts currently in place – use TESSB as model
 - ◇ TESSB contract should be starting *template* for any future PEF services
 - ◇ Share prequalification requirements

Recommendations – Short Term

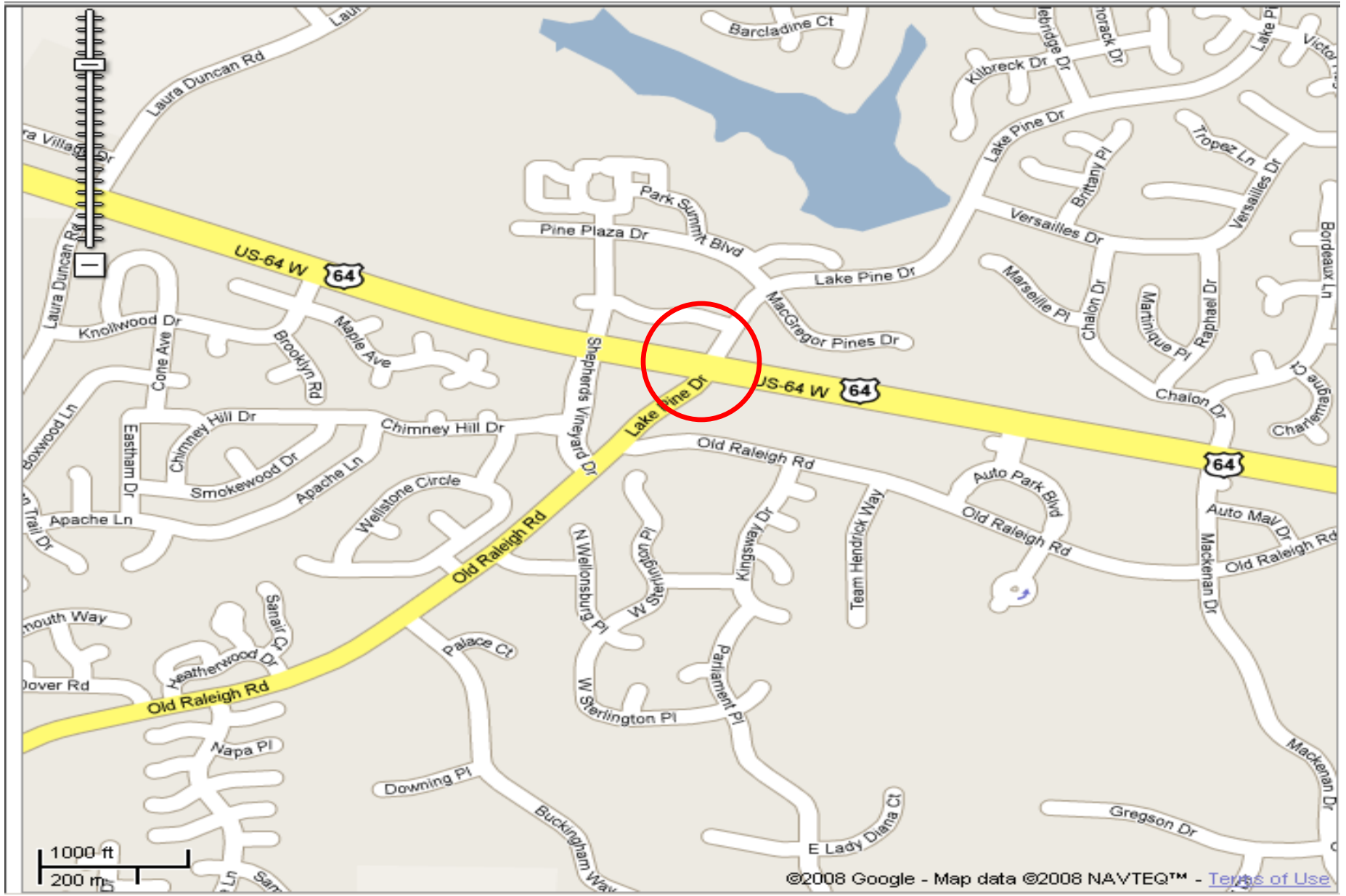
Develop Interim Traffic Count Library

- Use simple spreadsheet to start tracking count information
 - future posting to web & central database
 - Ascertain coordinate location of counts and/or devices
- Department standard for identifying data
 - Road segment, who requested it, associated with what TIP project
- Move all AADT GIS shapefiles into a Google map (example) interface for EASE of viewing from the WEB
 - Otherwise you have to find the route, locate the county, find the right sheet and find the count
 - <http://www.ncdot.org/it/img/DataDistribution/TrafficSurveyMaps/default.html>
- Model existing TESSB database

Who	What	Division	County	Where	Where	When	Why	Project	Map_It
Beatty, Will	16 hour, Turn Movement Count	5	Wake	US 64	Lake Pine Drive	16-Feb-08	TIP Alternative Analysis	U-2101	LINK
Patel, Alpesh	8 Hour Volume Count								LINK

<http://maps.google.com/maps?hl=en&q=US%2064%20and%20Lake%20Pine%20Drive%2C%20Cary%2C%20NC&um=1&ie=UTF-8&sa=N&tab=wl>

Who	What	Division	County	Where	Where	When	Why	Project	Map_It
Beatty, Will	16 hour, Turn Movement Count	5	Wake	US 64	Lake Pine Drive	16-Feb-08	TIP Alternative Analysis	U-2101	LINK



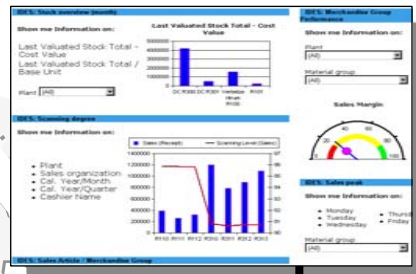
Recommendations – Long Term

Technology Issues

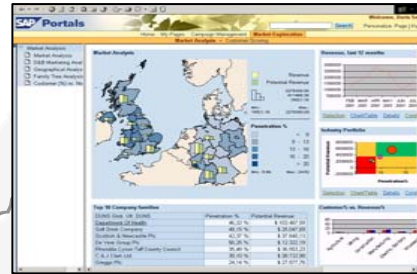
- Work with IT to migrate all HISTORICAL traffic count data into a CENTRAL location (**internal facing tool initially**)
 - **Info Cube** (storage) and **Spatial Data Viewer** (desktop access) concept
 - Consistent with TMT's Data Integration workstream
 - Easy to create forecasts and chart growth at particular locations
 - Search and sort capabilities
 - Develop security rights so consultants, public, developers can access
 - Use TMT Doc Management/Collaboration workgroup to help GIS define user requirements for SDV (August)

The Future -- DOT Data Integration

Executive Analytics



GIS Map Integration



Business Content

"Info Cube"

Business Warehouse (BW)

Traffic Counts

Pavement Records

Finance & Projects

Bridge

3rd Party

Other?

SAP

Spatial Data Viewer (SDV) Concept Demonstration (6.11.08)

The screenshot shows the 'Exploring - NCDOT_Demo' application window. The main map area displays a satellite view of a rural landscape with a road project highlighted in orange. A blue pushpin is placed on the map. A pop-up window titled 'TIPRoads2007_2013.shp' is open, displaying the following information:

OBJECTID 8
Program U
TIPProjNr U-3420
TIPProjNr2 U3420
ROUTE_CITY ELIZABETH CITY
DESCRIP SR 1309 (MAIN STREET) EXTENSION, PROPOSED US 17 BYPASS TO US 17 BYPASS (HUGHES BOULEVARD). UPGRADE ROADWAY, SOME NEW LOCATION WITH INTERCHANGE AT THE PROPOSED US 17 BYPASS.
BRG1
BRG2
BRG3

The application interface includes a menu bar (File, View, Tools, Help), a task center on the left with a search bar and a 'Find' button, and a list of tasks including 'Find Place', 'Find Address', 'Identify', 'Create Notes', 'NCDOT Find TIP Number', 'NCDOT Query Task', 'Find Division Boundary', 'NCDOT Find Route', 'NCDOT XY to Milepost', and 'ExcelTask'. The status bar at the bottom shows the position as 36°19'41"N 76°17'15"W, Altitude 5.37 Kilometers, and the time as 11:58 AM.

Recommendations – Short Term

Equipment / Technology Issues

- Determine best use of any and all traffic related assets within 3 Tiers
 - *fold under recommended Statewide Policy and New Operating Model*
- **Statewide Tier**
 - **Use available vehicle probe data on URBAN Interstates**
 - ◇ Only 10% of Interstate system instrumented with detection
 - ◇ GPS will be standard in vehicles by 2010
 - ◇ Where congestion info is most needed
 - **Use continuous counters (ATRs and WIMs) on RURAL Interstates**
 - ◇ Polled and processed nightly in SC
 - ◇ Hurricane evacuation use in FL
 - **Strategic management of WIM equipment**
 - ◇ **Equipment & Inventory Control (need more staff) OR**
 - ◇ **Division techs (with training) OR**
 - ◇ **Private firms**
 - ◇ *Follow FDOT Example—get back to the basics!*

Pending Federal Legislation for Managing Equipment

- Real-Time Information Program: Information Sharing Specifications and Data Exchange Format Reference Document
- Background
Section 1201 of SAFTEA-LU establishes the Real-Time System Management Information Program.
- The goals of this program are to improve security of the surface transportation system, address congestion problems, support improved response to weather events and surface transportation incidents, and facilitate national and regional highway traveler information.
 - The desired outcomes are to make Traffic and Travel Conditions Information available to the traveling public and to ease the sharing of Traffic and Travel Conditions Information among public agencies and private enterprise.
- See <http://www.ops.fhwa.dot.gov/publications/datexformat/index.htm>



Home | Accessibility | DOT Resources | Disclaimer | Contact Us | Site Map | Search Go!

Inside SCDOT | Getting Around in SC | Doing Business with SCDOT | Public Forum | Community Service

Getting Around in South Carolina

Quicklinks Go!

Travel Advisories

[Traffic Cameras](#)
[SC Road Conditions](#)
[Winter Road Conditions](#)
[Nationwide Conditions](#)
[SCDOT Incident Response](#)
[Motorcycles & Traffic Signals](#)
[Traffic Counts](#)
[State Line Bridges](#)
[Bridge Load Restrictions](#)
[Resurfacing Program](#)

Current SC Weather

[CNN.com](#)
[The Weather Channel](#)
[Weather Underground](#)
[Nat'l. Weather Service](#)
[Intellicast](#)

Traffic Information

[Traffic Cameras](#)
[Logo Sign Program](#)
[Motorcycles & Traffic Signals](#)
[Traffic Counts](#)

Emergency Response

[Emergency Response Procedures](#)
[SCDOT Incident Response](#)
[Coastal Evacuation Routes](#)

Highways or Dieways

[Official Site](#)

State Maps

[Map Information](#)
[Interstate & Welcome / Rest Areas](#)
[Map](#)
[Coastal Evacuation Routes](#)

Tourism



Traffic Polling and Analysis System

[Launch Traffic System](#)

System Description

The Traffic Polling and Analysis System provides traffic data and graphs from traffic counting devices on South Carolina's Highways. This system is intended for the general public to view current and historical traffic information during hurricane evacuation events.

Directions for use

Upon entering the system, click on the 'START' button at the bottom of the page to launch the application. A map will appear with blue and pink dots marking the locations of the Automatic Traffic Recorders (ATR). Select a location by clicking one of the dots. The darker blue dots represent data polled nightly. The lighter pink dots represent data polled hourly.

A counter data page will appear which shows hourly vehicle counts. Where available, the ATRs will also provide average speeds.

From the counter data page, you can access charts displaying historical averages vs. real-time counts by clicking on the chart graphic located just above the data

Related Topics



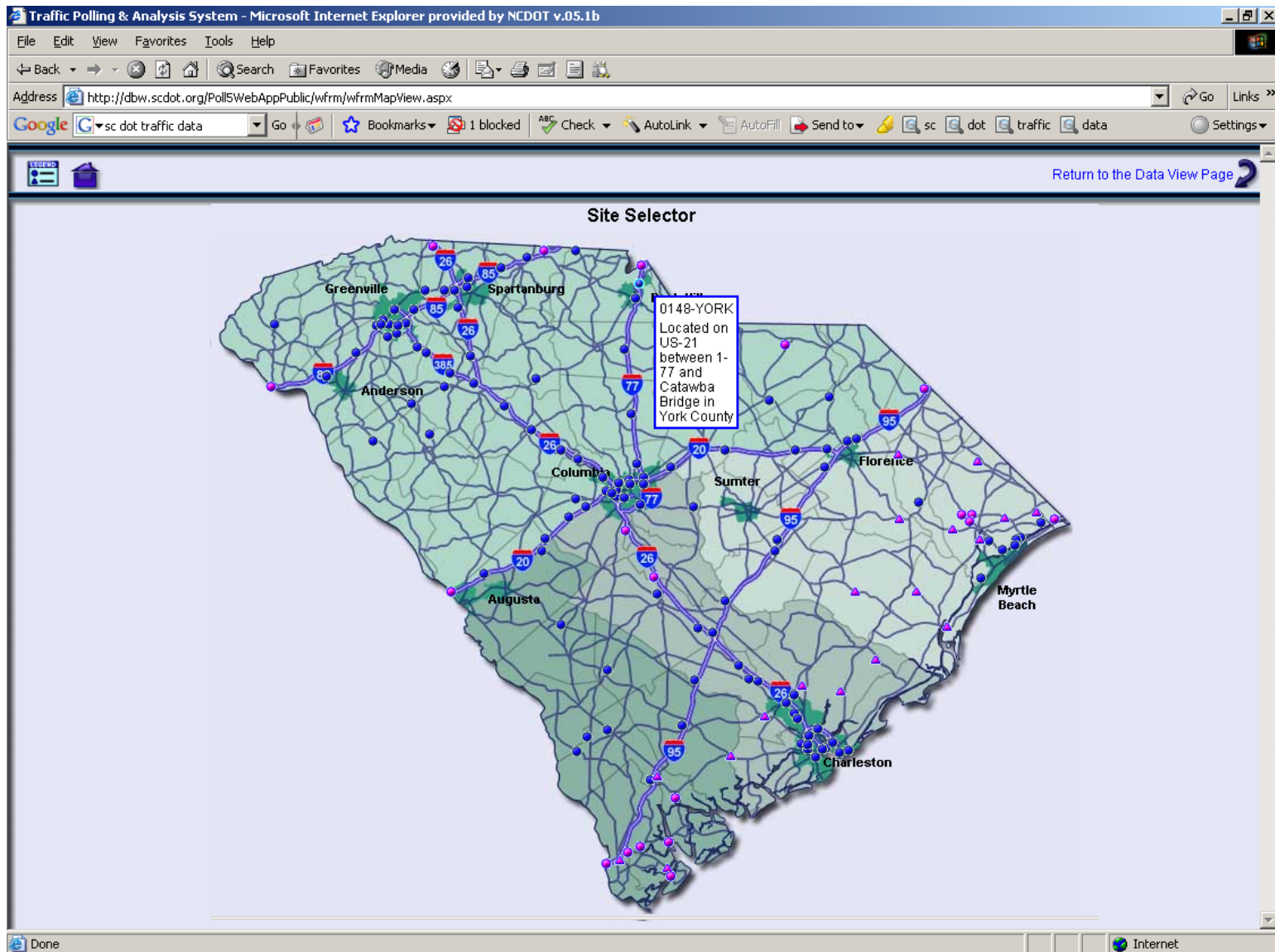
[Average Annual Daily Traffic](#)



[Coastal Evacuation Directions, Route Maps and Lane Reversal Plans](#)



[SCDOT Incident Response](#)



View Data - Microsoft Internet Explorer provided by NCDOT v.05.1b

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print Copy Paste

Address http://dbw.scdot.org/PollWebAppPublic/wfrm/wfrmViewDataNightly.aspx Go Links >>

Google sc dot traffic data Go 1 blocked Check AutoLink AutoFill Send to sc dot traffic data Settings

SCDOT TRAFFIC POLLING & ANALYSIS SYSTEM

Version: 1.7.30.0

Help Exit View Site Locator Map

View to Graph

Atr 0068-1 0069 - 1 0070-1 Date 06/10/2008 GO

North South
SPEED LIMIT 60 SPEED LIMIT 60

Site: 0069-YORK for Tuesday, 06/10/2008
Site Location: I-77 Between US-21 & S-122

Time	Northbound			Southbound		
	Vehicle Count		Average Speed (MPH)	Vehicle Count		Average Speed (MPH)
	Current	Historical		Current	Historical	
01:00	369	343	71	445	420	61
02:00	301	225	73	247	253	61
03:00	339	226	74	235	219	62
04:00	337	288	73	270	240	62
05:00	411	440	67	393	312	60
06:00	1036	1024	68	583	540	59
07:00	2199	2126	70	937	1075	60
08:00	2585	2710	70	1485	1644	59
09:00	1839	1793	70	1335	1418	59
10:00	1456	1500	69	1391	1476	65
11:00	1431	1435	69	1280	1467	64
12:00	1481	1523	70	1352	1430	65
13:00	1548	1480	70	1335	1464	65
14:00	1643	1570	70	1234	1520	63
15:00	1759	1793	70	1413	1659	65
16:00	1697	1864	69	1824	1981	64
17:00	1629	1894	70	1948	2306	64
18:00	1710	1896	70	2147	2573	62
19:00	1415	1526	70	1832	1764	62
20:00	1044	1120	70	1206	1190	67
21:00	924	875	69	1003	955	66
22:00	721	726	68	890	887	65
23:00	658	648	68	644	620	65

Done Internet



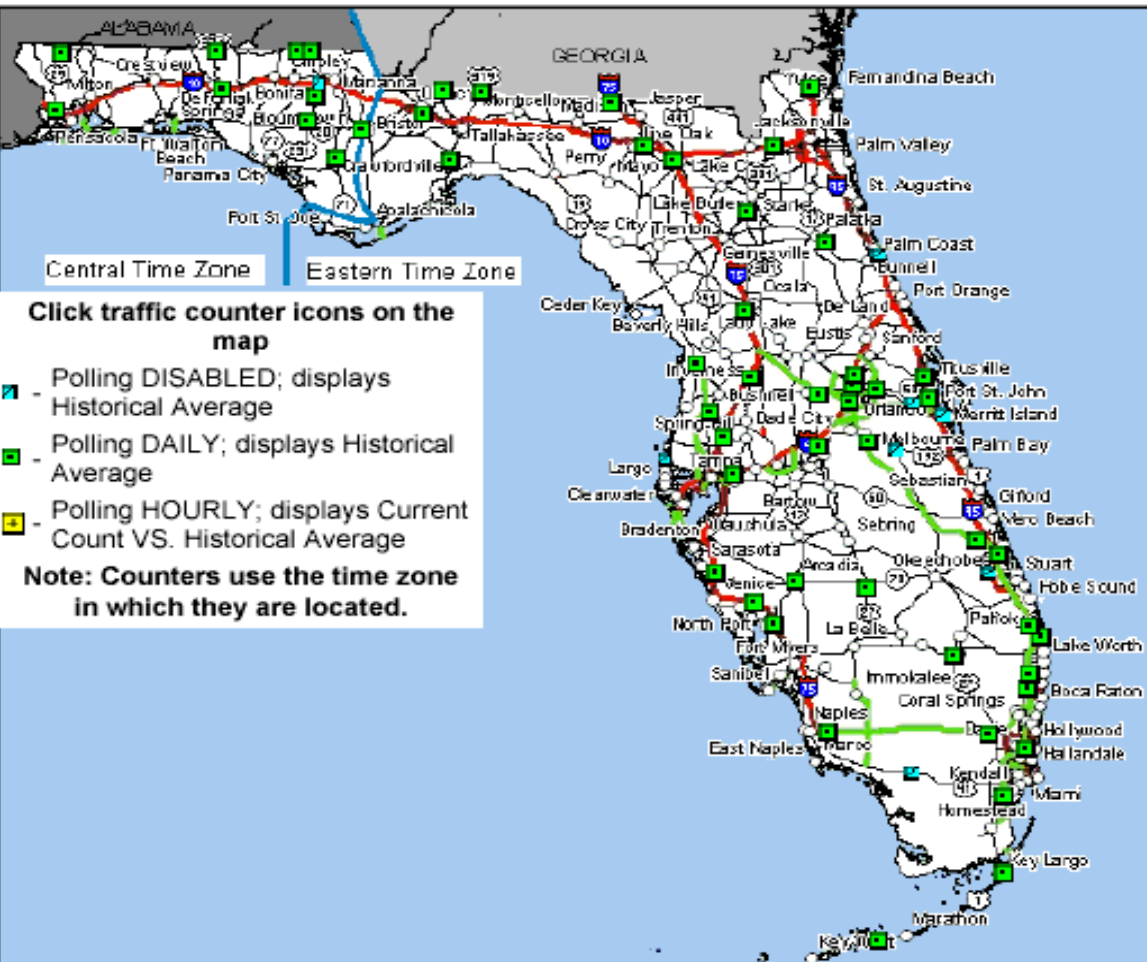
Florida DOT

Can poll continuously

BUT

Chose to do this monthly instead of every day for cost effectiveness

Primarily used for **special events and emergency and evac situations**



E-mail questions and comments to:
[Florida Department of Transportation's Help Desk](#)

<http://www3.dot.state.fl.us/trafficinformation/>

Recommendations – Short Term

Equipment / Technology Issues

- Determine best use of any and all traffic related assets within 3 Tiers
 - *fold under recommended Statewide Policy and New Operating Model*
- **Regional and Subregional Tiers**
 - **Purchase and deploy more portable radar technology in place of manual tube counters**
 - ◇ Mast mounted system with radar head—can provide real time speed data
 - ◇ Reduces labor time and inaccuracies that occur when tubes are destroyed
 - ◇ Typically used for short term counts only
 - **Study the use of traffic signals as counters on urban primary routes**
 - ◇ NCDOT maintains approx 200 signal systems (7000 systems exist statewide)
 - ◇ Data storage and number of loops is current constraint
 - ◇ Detectors can be configured to send a second signal independent from the controller
 - ◇ Learn from municipalities, overcome constraints and merge data into DOT's central database/info cube

PNITDS

Portable Non-Intrusive Traffic Detection System



Mounts on the Back - Doesn't Interfere with Sign



Radar Head - Solar Panels - Pole System - Battery Cabinet



Clamping System: Pivot Clamp and Upper Clamp



Battery Cabinet: Solar Regulator and 12 V Battery Pair



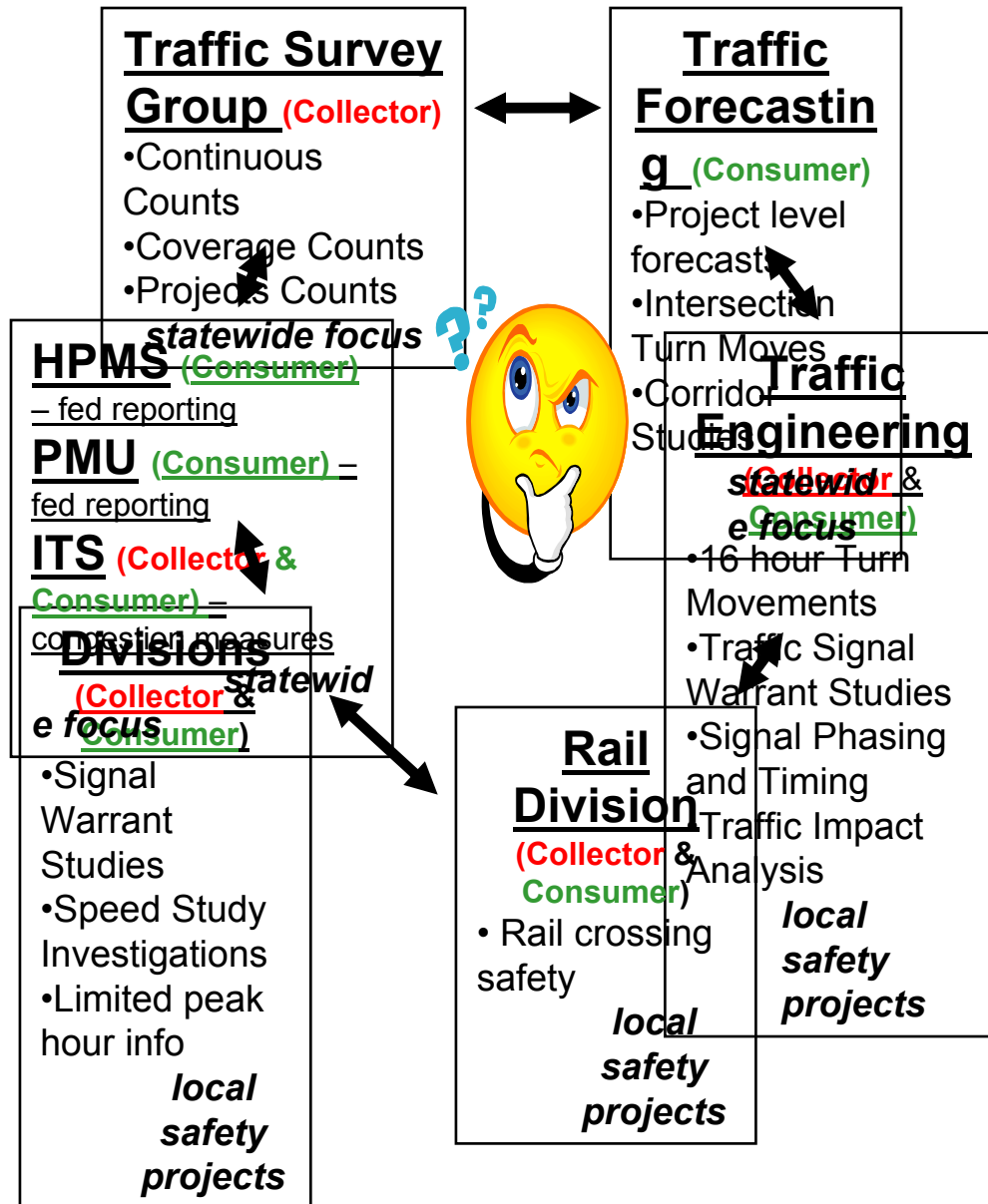
Equipment Pole: Radar Head and Solar Panel Mounts

Questions?

RECOMMENDATIONS - *Summary*

- Determine a better OPERATING MODEL
 - Multiple units vs consolidation of count collection
- Create a clear, visible POLICY for managing Traffic Count Program
 - Plan work in more coordinated fashion
 - Scrutinize need of traffic count requests
 - Build “forecasting” capabilities within key BU’s; hold them accountable for decision making
- Build count REPOSITORY; make data accessible via web
- Determine best use of traffic related devices/technology within 3 Tiers
 - Coordinating equipment specs and purchase
 - Leverage technology to stream info to customers
- Hold Workshop (July 23) to determine “hows” of implementation
 - “pre-workshop” discussion with BU managers
 - Report results to TMT & LT (week of July 28)

Facts and Findings – Collectors vs Consumers



- **Host full day workshop -- July 23**
 - Kickoff event to start communicating better and review preliminary recommendations
 - Invite: Collectors and Consumers
 - ◇ TSG, TESSB, ITS, Traffic Forecasting, HPMS, PMU, Operations and IT
 - ◇ FHWA national expert
- **DRAFT AGENDA**
 - Review federal/state requirements and national best practice
 - Program management issues
 - ◇ Consolidation of count collection
 - ◇ Statewide Policy – communication, workload and workflow, PEF contracts, critical path needs, customer expectations, etc
 - ◇ Count Repository – pilot short term library concept
 - ◇ Equipment/technology strategies
 - Brainstorm other improvement opportunities

Recommendations – NEW Operating Model

16 hour counts / continuous counts / coverage counts / Turn Moves

Central management of program
Central ownership of data
Central owner and operator of traffic related equipment
Standards
Central ownership of Database with access via web
statewide focus

** Utilize*
1) PEF's &
2) Division staff
to help manage
workload

HPMS (Consumer) – fed reporting
PMU (Consumer) – fed reporting
ITS (Consumer) – congestion measures
Traffic Forecasting (Consumer) –
TIP delivery

Rail Division
(Consumer)

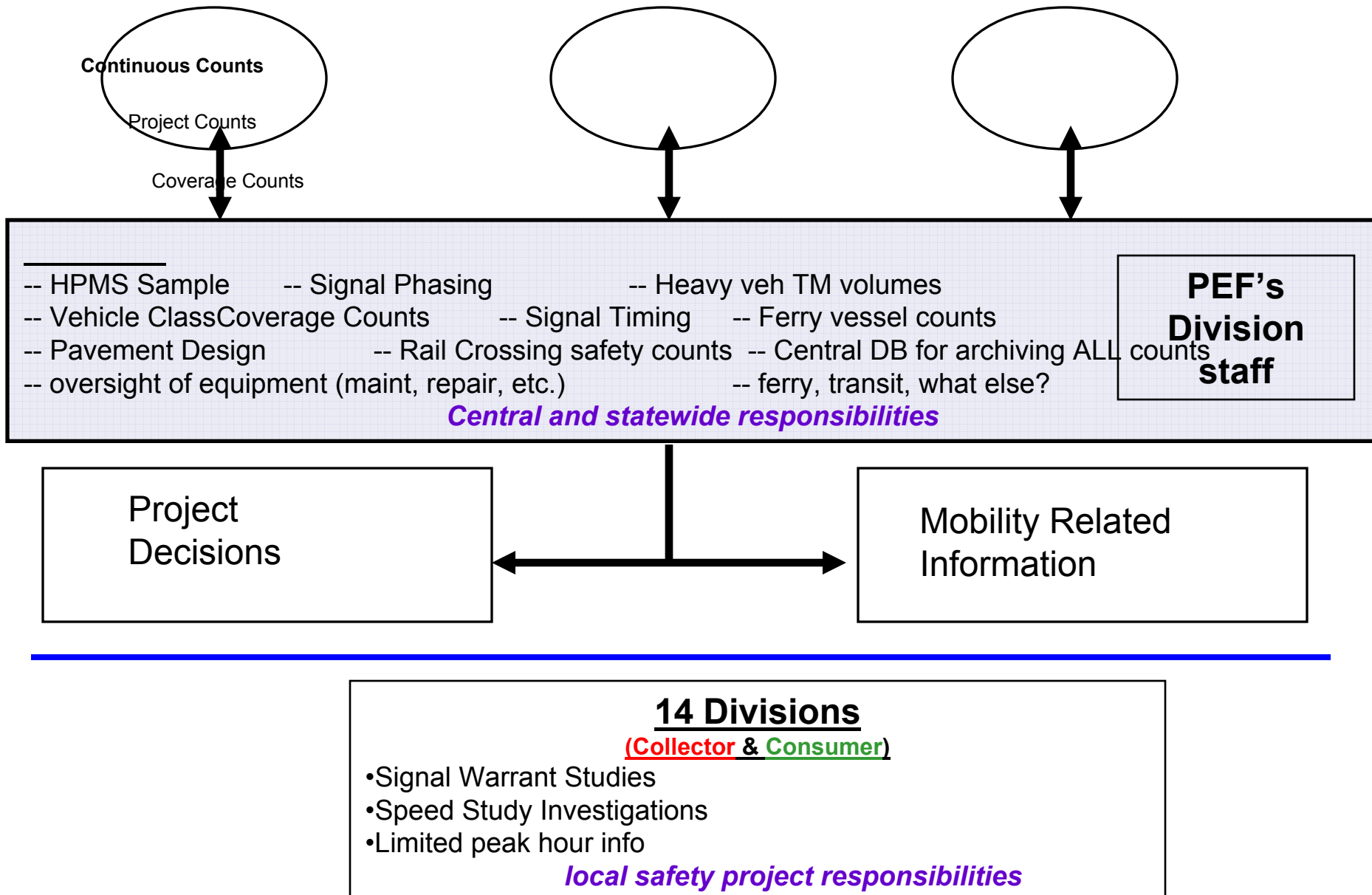
Traffic Engineering (Consumer)
•Traffic Signal Warrant Studies
•Signal Phasing and Timing
•Traffic Impact Analysis
local safety projects

14 Divisions

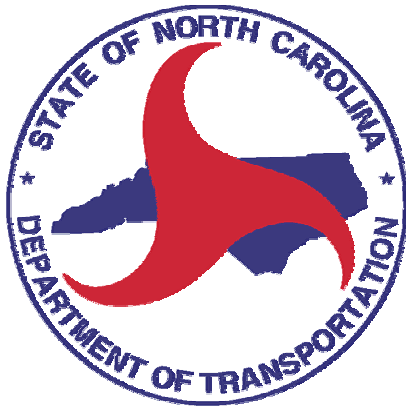
(Collector & Consumer)

- Signal Warrant Studies
 - Speed Study Investigations
 - Limited peak hour info
- local safety projects*

What about non-hwy counts such as ferry and transit?



Traffic Counts / Traffic Data Management



TMT Presentation
June 23, 2008

- Workgroup team
- Why Conduct this Workstream?
- Approach
- Hypothesis
- Facts and Findings
- Recommendations
- Next Steps

Workgroup Team

- Alpesh Patel – TMT Lead
- Meredith McDiarmid – Work Zone Traffic Control
- Will Beatty – FHWA
- Other Key Workstream contributors
 - Traffic Survey Group (Transportation Planning Branch)
 - Traffic Engineering and Safety Systems Branch
 - ITS Operations Unit
 - Division Traffic Engineers / Regional Traffic Engineers
 - Traffic Forecasting Units (Transportation Planning Branch)

Why Conduct this Workstream?

- Conducted Department-wide “Bottoms Up” evaluation – November 2007 to January 2008
- Findings categorized under 4 study areas (Feb. 2008):
 - “Deep Dive” Workstreams
 - Internal Efficiencies
 - Training Opportunities
 - Procedural Changes
- *Traffic Counts/Traffic Data Management* identified as 1 of 3 Deep Dive workstreams

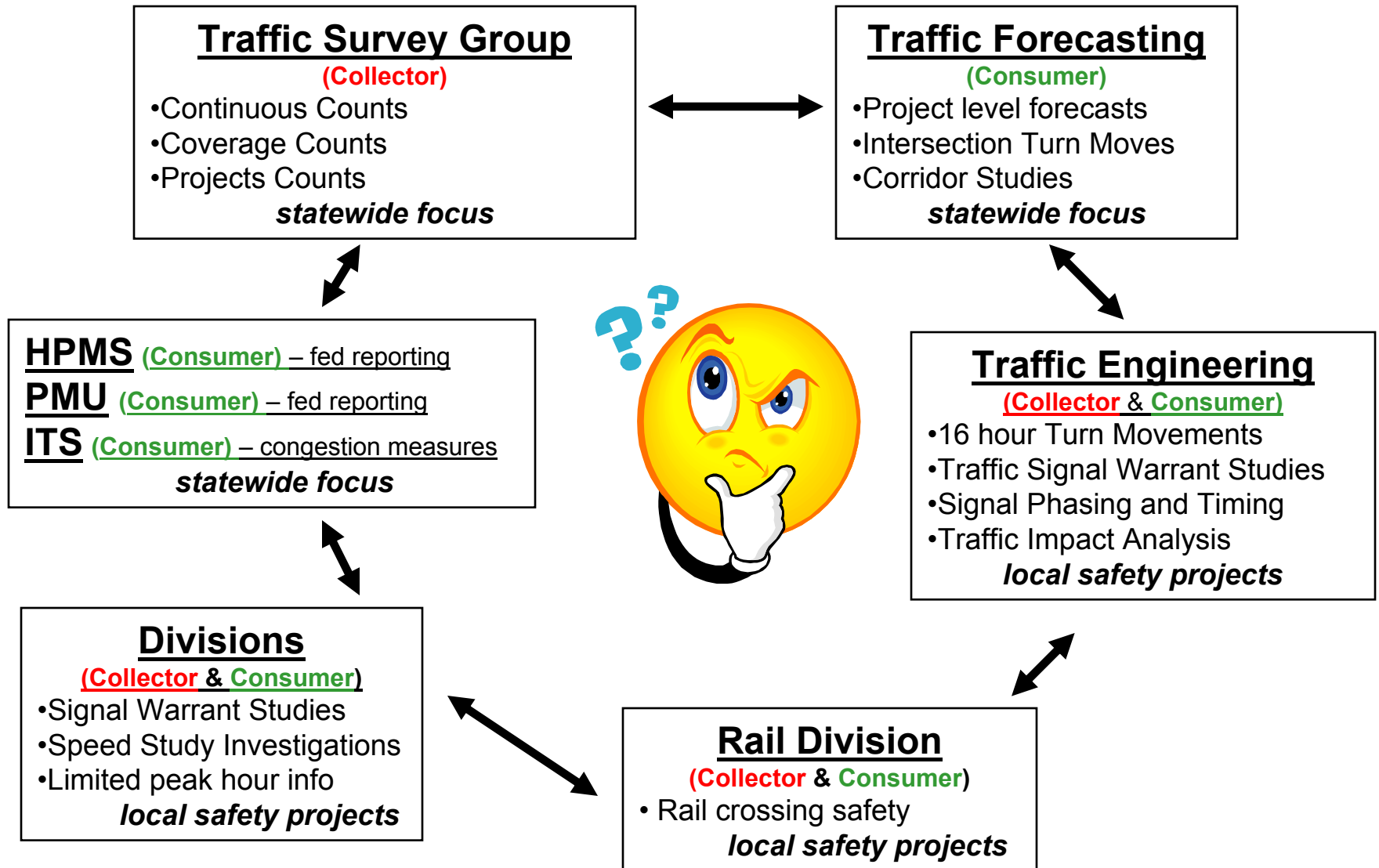
Approach – March to June

- Stakeholder Interviews
 - Traffic Eng, Traffic Surveys, ITS, Work Zone Traffic, Forecasting Unit in TPB, GIS
- National best practice research
 - Iowa, Illinois, Georgia, Florida, New York, Wisconsin, South Carolina
- Survey to all 14 Divisions
- Field trips to Division 6 and 2 municipalities
- Quarterly roundtable with Regional and Division Traffic Engineers
- Resources referred to:
 - FHWA Traffic Monitoring Guide
 - Traffic Monitoring System (Dec 03)
 - AASHTO guidelines
 - Articles on Traffic Flow technology
 - Mike Bruff PMP paper (1999)

Hypothesis

- To identify a more strategic approach to managing traffic data and count collection services statewide. Analysis includes:
 - shared use and communication capabilities of equipment
 - use of technology to stream information in real time to internal and external customers. Storage and maintenance of data in a single database with mapping interface
 - improved collaboration of various BU's that either produce or need the data. consideration of a plan to govern long term decision making on the placement, use, collection & dissemination of traffic data

Facts and Findings – Collectors vs Consumers



Facts and Findings – Common Themes

- **6-7 separate entities in NC that collect counts BUT**
 - 1) Data is stored “locally” and
 - 2) Counts are used for different purposes
 - ◇ Traffic Survey Group
 - ◇ Traffic Eng and Safety Systems
 - ◇ Developers/consultants
 - ◇ MPOs/RPOs
 - ◇ Municipalities
 - ◇ Rail Division (8000 crossings)
- **Unplanned Work / Delivery issues**
 - Duplication—2 different groups collecting counts in same location, one week apart
 - Some elements of current model are more “reactive” than proactive
 - ◇ No pattern of seasonal work that can be managed and evened out
 - ◇ 8-10 weeks to turn around TM request; 5-10 months on project level forecast

Facts and Findings – Common Themes

- **More permanent detectors vs using vehicles as “traffic probes” (GPS technology)**
- **Capture all count info (and history) in one map, and uploaded to one location**
 - Easy to find from DOT website
 - Search and sort capabilities
- **Shared resource and asset issues**
 - Use of equipment for both mobility measurement & project level work
 - Use of PEF's may alleviate workload burden
 - Only 17 of 45 WIM stations in NC are operational

RECOMMENDATIONS - *Summary*

- NCDOT needs a clear, visible POLICY on managing its traffic count program
- Determine best operating model
 - Multiple units vs consolidation of count collection
- Plan work in more coordinated fashion
- Scrutinize need of traffic count requests
- Build “forecasting” capabilities within key BU’s; hold them accountable for decision making
- Store counts in central location; make data accessible via web
- Best use of traffic related assets within 3 Tiers
- Hold Workshop on July 9th with key stakeholders
 - Report on Workshop results to TMT & LT in late July/early August

Recommendations – Short Term

Formalize Roles & Responsibilities

- Develop Statewide Traffic Count Management POLICY
 - Identify Role, Responsibilities & Metrics of BUs that collect counts and why
 - Determine best operating model for traffic count collection vs consumption?
 - ◇ Should each separate BU be responsible for collecting data OR
 - ◇ Consolidate count collection into one area of NCDOT (in house or by PEFs)
 - Establish clear guidelines and standards
 - ◇ who, when, where, and how count data should be collected and stored
 - Identify customer expectations and clear purpose and need for count request
 - ◇ Quality of data
 - ◇ Turnaround times
 - ◇ Tie expectations to individual BU metrics and/or create shared metrics
 - New rules/criteria to determine if count request is even necessary
 - ◇ Extraneous intersection counts on bridge forecasts

Recommendations – Short Term

Formalize Roles & Responsibilities

- Develop Statewide Traffic Count Management POLICY (con't)
 - Create “forecasting” skills/capability within the BU’s requesting this service
 - ◇ Scrutinize forecast request
 - * Simple bridge forecast—use trend line analysis
 - * If it requires a model then go to TPB
 - ◇ Biggest requesters currently are:
 - * PDEA
 - * Feasibility Studies
 - * Divisions
 - * Consultants
 - Determine IF service priorities are necessary – what counts should be collected first and why?
 - ◇ Review Federal/state requirements
 - ◇ Service priorities for individual BU customers VS. priorities that move DOT dashboard gauges
 - * What to do when these priorities conflict?

Recommendations – Short Term

Plan Your Work...Together!

- Develop Statewide Traffic Count Management POLICY (con't)
 - Develop annual work schedules together in January
 - ◇ What locations will require counts (and what type)?
 - ◇ Determine how to use PEF's to balance workload and set milestones for timely delivery to customers
 - ◇ Start with supporting *Proof of Concept* projects in TIP Delivery workstream
 - Review all contracts currently in place – use TESSB as model
 - ◇ Each Unit should look at their contracts to see if they could be used to help alleviate the burden of additional (read as unplanned) work
 - ◇ Could another Units' contract be used as a *template* to create a new contract
 - ◇ BU's should share requirements for prequalification
 - * TESSB
 - * Traffic Forecasting
 - * TSG

Recommendations – Short Term

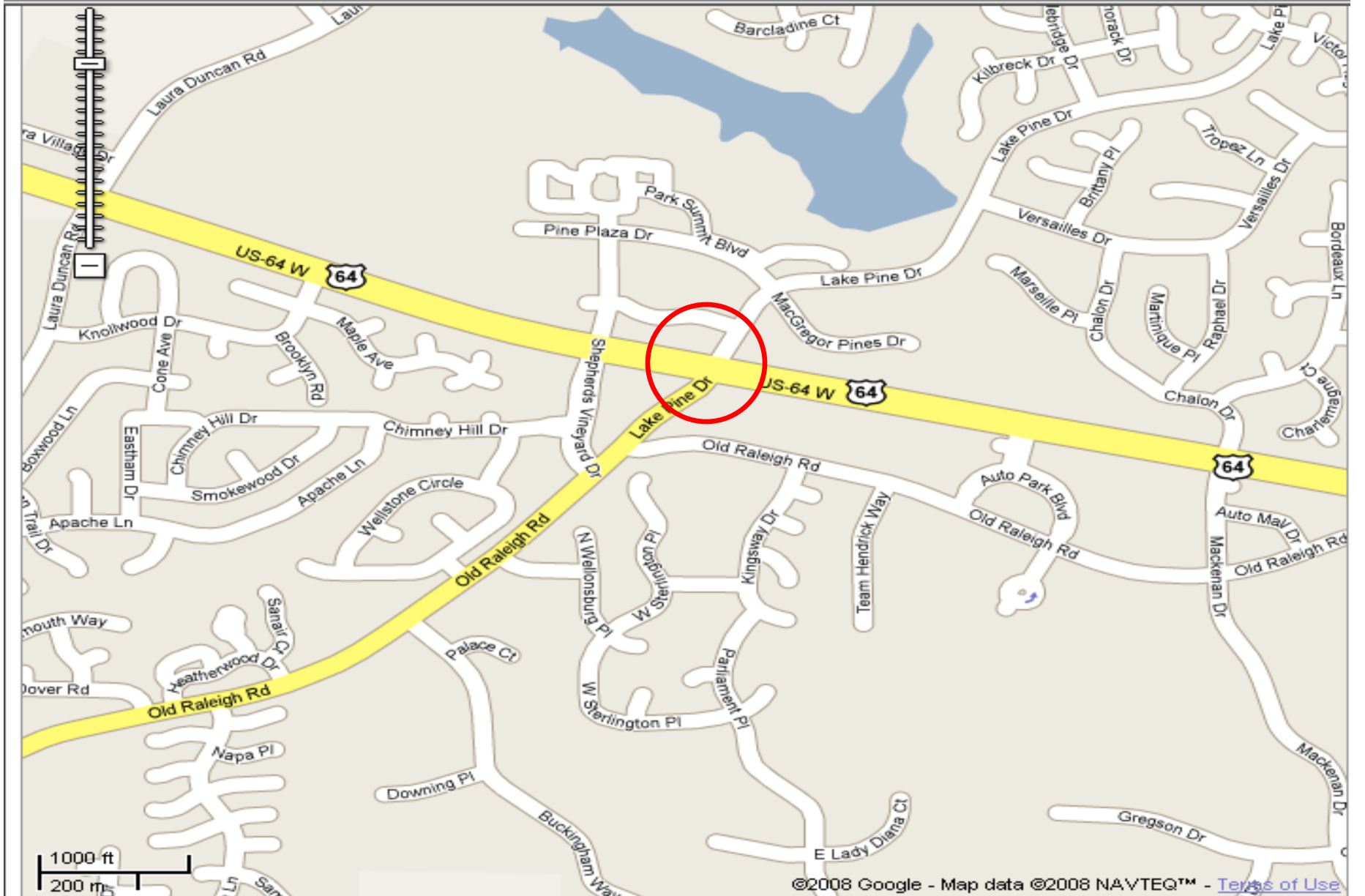
Develop Interim Traffic Count Library

- Use simple spreadsheet to start tracking count information
 - future posting to web & central database
 - Ascertain coordinate location of counts and/or devices
- Department standard for identifying data
 - Road segment, who requested it, associated with what TIP project
- Move all AADT GIS shapefiles into a Google map interface for EASE of viewing from the WEB
 - Otherwise you have to find the route, locate the county, find the right sheet and find the count
 - <http://www.ncdot.org/it/img/DataDistribution/TrafficSurveyMaps/default.html>
- Link with existing TESSB database

Who	What	Division	County	Where	Where	When	Why	Project	Map_It
Beatty, Will	16 hour, Turn Movement Count	5	Wake	US 64	Lake Pine Drive	16-Feb-08	TIP Alternative Analysis	U-2101	LINK
Patel, Alpesh	8 Hour Volume Count								LINK

<http://maps.google.com/maps?hl=en&q=US%2064%20and%20Lake%20Pine%20Drive%2C%20Cary%2C%20NC&um=1&ie=UTF-8&sa=N&tab=wl>

Who	What	Division	County	Where	Where	When	Why	Project	Map_It
Beatty, Will	16 hour, Turn Movement Count	5	Wake	US 64	Lake Pine Drive	16-Feb-08	TIP Alternative Analysis	U-2101	LINK



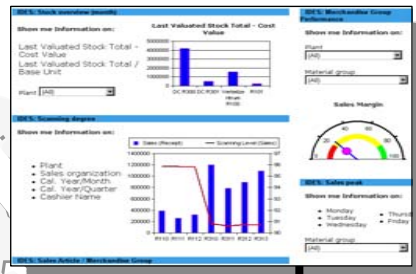
Recommendations – Long Term

Technology Issues

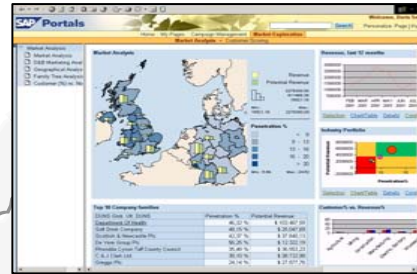
- Work with IT to migrate all HISTORICAL traffic count data into a CENTRAL location **(internal facing tool initially)**
 - Info Cube (storage) and Spatial Data Viewer (desktop access) concept
 - Consistent with Mark's Data Integration workstream
 - Easy to create forecasts and chart growth at particular locations
 - Search and sort capabilities
 - Develop security rights so consultants, public, developers can access
 - Use Doc Mngment/Collaboration workgroup to help GIS define user requirements for SDV (late summer)

The Future -- DOT Data Integration

Executive Analytics



GIS Map Integration



Business Content

"Info Cube"

Business Warehouse (BW)

Traffic Counts

Pavement Records

Finance & Projects

Bridge

3rd Party

Other?

SAP

Spatial Data Viewer (SDV) Concept Demonstration (6.11.08)

The screenshot shows the 'Exploring - NCDOT_Demo' application window. The main map area displays a satellite view of a rural landscape with a road project highlighted in orange. A blue pushpin is placed on the map. A pop-up window titled 'TIPRoads2007_2013.shp' is open, displaying the following information:

OBJECTID 8
Program U
TIPProjNr U-3420
TIPProjNr2 U3420
ROUTE_CITY ELIZABETH CITY
DESCRIP SR 1309 (MAIN STREET) EXTENSION, PROPOSED US 17 BYPASS TO US 17 BYPASS (HUGHES BOULEVARD). UPGRADE ROADWAY, SOME NEW LOCATION WITH INTERCHANGE AT THE PROPOSED US 17 BYPASS.
BRG1
BRG2
BRG3

The left sidebar contains a 'Tasks' menu with options: Find Place, Find Address, Identify, Create Notes, NCDOT Find TIP Number, NCDOT Query Task, Find Division Boundary, NCDOT Find Route, NCDOT XY to Milepost (selected), and ExcelTask. The bottom status bar shows the position: 36°19'41"N 76°17'15"W, Altitude: 5.37 Kilometers. The taskbar at the bottom includes Start, Tasks, and several open applications: Tasks on dt-bench..., C:\WINDOWS\sys..., Untitled - ArcGlobe..., Exploring - NCD..., and AGX_TIP.bmp - Paint.

Recommendations – Short Term

Equipment / Technology Issues

- Determine best use of any and all traffic related assets within 3 Tiers
 - fold under recommended Statewide Policy
- Pending federal legislation – *out for national comment*
- Statewide Tier
 - **Use available vehicle probe data on URBAN Interstates**
 - ◇ Only 10% of Interstate system instrumented with detection
 - ◇ GPS will be standard in vehicles by 2010
 - ◇ Where congestion info is most needed
 - **Use continuous counters (ATRs and WIMs) on RURAL Interstates**
 - ◇ Polled and processed nightly in SC
 - ◇ Hurricane evacuation use in FL
 - **Division signal techs (with training) manage WIM equipment instead of Traffic Survey Group**
 - ◇ Only 17 of 45 WIMs are operational
 - ◇ Follow FDOT Example—get back to the basics!

Pending Federal Legislation for managing equipment

- Real-Time Information Program: Information Sharing Specifications and Data Exchange Format Reference Document
- Background
Section 1201 of SAFTEA-LU establishes the Real-Time System Management Information Program.
- The goals of this program are to improve security of the surface transportation system, address congestion problems, support improved response to weather events and surface transportation incidents, and facilitate national and regional highway traveler information.
 - The desired outcomes are to make Traffic and Travel Conditions Information available to the traveling public and to ease the sharing of Traffic and Travel Conditions Information among public agencies and private enterprise.
- See <http://www.ops.fhwa.dot.gov/publications/datexformat/index.htm>



Home | Accessibility | DOT Resources | Disclaimer | Contact Us | Site Map | Search Go!

Inside SCDOT | Getting Around in SC | Doing Business with SCDOT | Public Forum | Community Service

Getting Around in South Carolina

Quicklinks Go!

Travel Advisories

[Traffic Cameras](#)
[SC Road Conditions](#)
[Winter Road Conditions](#)
[Nationwide Conditions](#)
[SCDOT Incident Response](#)
[Motorcycles & Traffic Signals](#)
[Traffic Counts](#)
[State Line Bridges](#)
[Bridge Load Restrictions](#)
[Resurfacing Program](#)

Current SC Weather

[CNN.com](#)
[The Weather Channel](#)
[Weather Underground](#)
[Nat'l. Weather Service](#)
[Intellicast](#)

Traffic Information

[Traffic Cameras](#)
[Logo Sign Program](#)
[Motorcycles & Traffic Signals](#)
[Traffic Counts](#)

Emergency Response

[Emergency Response Procedures](#)
[SCDOT Incident Response](#)
[Coastal Evacuation Routes](#)

Highways or Dieways

[Official Site](#)

State Maps

[Map Information](#)
[Interstate & Welcome / Rest Areas](#)
[Map](#)
[Coastal Evacuation Routes](#)

Tourism



Traffic Polling and Analysis System

[Launch Traffic System](#)

System Description

The Traffic Polling and Analysis System provides traffic data and graphs from traffic counting devices on South Carolina's Highways. This system is intended for the general public to view current and historical traffic information during hurricane evacuation events.

Directions for use

Upon entering the system, click on the 'START' button at the bottom of the page to launch the application. A map will appear with blue and pink dots marking the locations of the Automatic Traffic Recorders (ATR). Select a location by clicking one of the dots. The darker blue dots represent data polled nightly. The lighter pink dots represent data polled hourly.

A counter data page will appear which shows hourly vehicle counts. Where available, the ATRs will also provide average speeds.

From the counter data page, you can access charts displaying historical averages vs. real-time counts by clicking on the chart graphic located just above the data

Related Topics



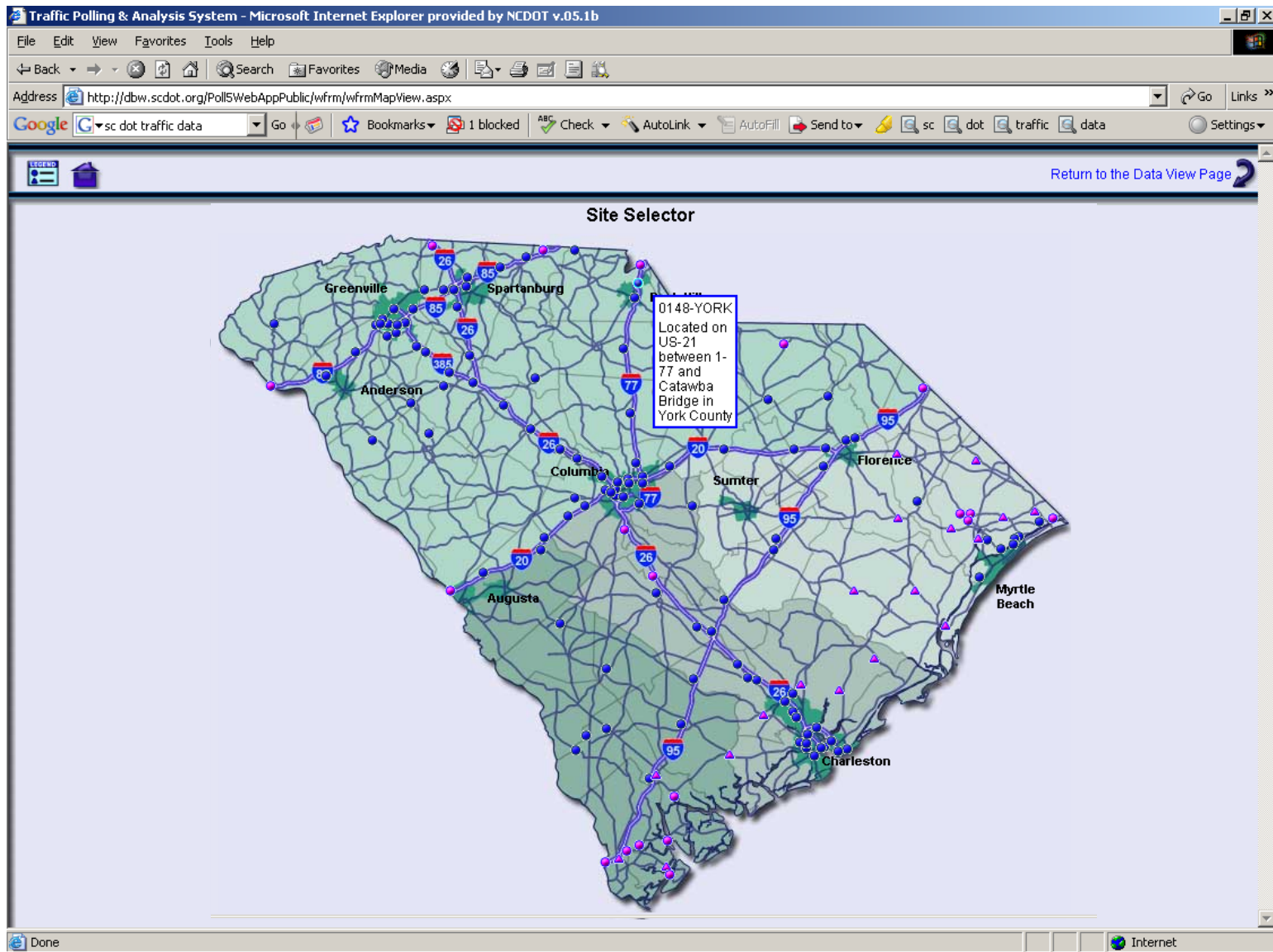
[Average Annual Daily Traffic](#)



[Coastal Evacuation Directions, Route Maps and Lane Reversal Plans](#)



[SCDOT Incident Response](#)



View Data - Microsoft Internet Explorer provided by NCDOT v.05.1b

File Edit View Favorites Tools Help

Back Forward Stop Reload Home Search Favorites Media Print Copy Paste Address http://dbw.scdot.org/PollWebAppPublic/wfrm/wfrmViewDataNightly.aspx Go Links >>

Google G sc dot traffic data Go 1 blocked Check AutoLink AutoFill Send to sc dot traffic data Settings

SCDOT TRAFFIC POLLING & ANALYSIS SYSTEM

Version: 1.7.30.0

Help Exit View Site Locator Map

View to Graph

Atr 0068-1 0069 - 1 0070-1 Date 06/10/2008 GO

North South
SPEED LIMIT 60 SPEED LIMIT 60

Site: 0069-YORK for Tuesday, 06/10/2008
Site Location: I-77 Between US-21 & S-122

Time	Northbound			Southbound		
	Vehicle Count		Average Speed (MPH)	Vehicle Count		Average Speed (MPH)
	Current	Historical		Current	Historical	
01:00	369	343	71	445	420	61
02:00	301	225	73	247	253	61
03:00	339	226	74	235	219	62
04:00	337	288	73	270	240	62
05:00	411	440	67	393	312	60
06:00	1036	1024	68	583	540	59
07:00	2199	2126	70	937	1075	60
08:00	2585	2710	70	1485	1644	59
09:00	1839	1793	70	1335	1418	59
10:00	1456	1500	69	1391	1476	65
11:00	1431	1435	69	1280	1467	64
12:00	1481	1523	70	1352	1430	65
13:00	1548	1480	70	1335	1464	65
14:00	1643	1570	70	1234	1520	63
15:00	1759	1793	70	1413	1659	65
16:00	1697	1864	69	1824	1981	64
17:00	1629	1894	70	1948	2306	64
18:00	1710	1896	70	2147	2573	62
19:00	1415	1526	70	1832	1764	62
20:00	1044	1120	70	1206	1190	67
21:00	924	875	69	1003	955	66
22:00	721	726	68	890	887	65
23:00	658	648	68	644	620	65

Done Internet



Traffic Information

[Help](#)

Florida DOT Here

Can polling continuously




BUT

Choose to do this monthly instead of every day for cost effectiveness

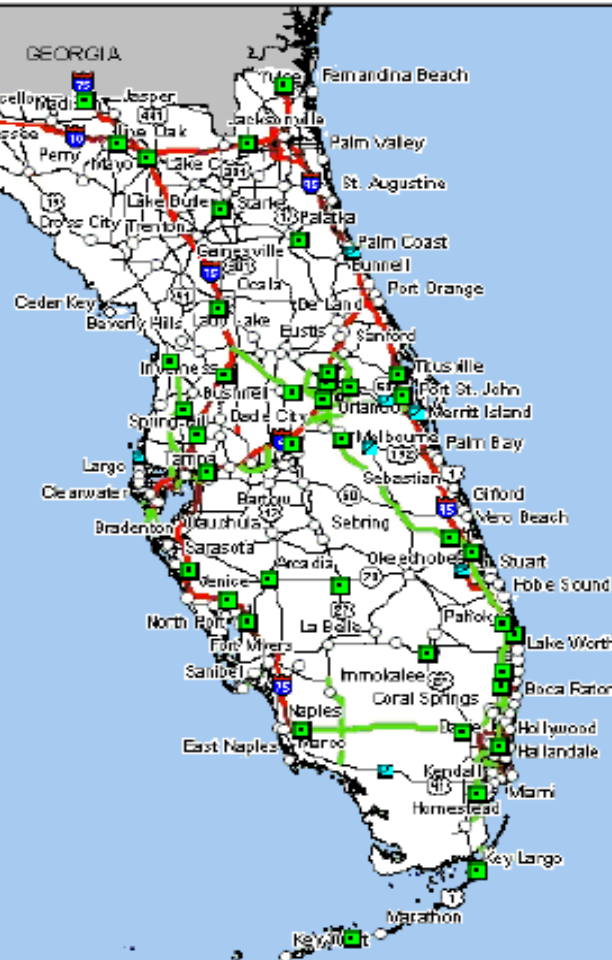
Primarily used for **special events and emergency and evac situations**

Central Time Zone Eastern Time Zone

Click traffic counter icons on the map

-  - Polling DISABLED; displays Historical Average
-  - Polling DAILY; displays Historical Average
-  - Polling HOURLY; displays Current Count VS. Historical Average

Note: Counters use the time zone in which they are located.



E-mail questions and comments to:
[Florida Department of Transportation's Help Desk](#)

<http://www3.dot.state.fl.us/trafficinformation/>

Recommendations – Short Term

Equipment / Technology Issues

- Determine best use of any and all traffic related assets within 3 Tiers
 - fold under recommended Statewide Policy
- Regional and Subregional Tiers
 - Purchase and deploy more portable radar technology in place of manual tube counters
 - ◇ Mast mounted system with radar head—can provide real time speed data
 - ◇ Reduces labor time and inaccuracies that occur when tubes are destroyed
 - ◇ Typically used for short term counts only
 - Study the use of traffic signals as counters on urban primary routes
 - ◇ NCDOT maintains approx 200 signal systems (7000 systems exist statewide)
 - ◇ Data storage and number of loops is current constraint
 - ◇ Detectors can be configured to send a second signal independent from the controller
 - ◇ Learn from municipalities, overcome constraints and merge data into DOT's central database/info cube

PNITDS

Portable Non-Intrusive Traffic Detection System



Mounts on the Back - Doesn't Interfere with Sign



Radar Head - Solar Panels - Pole System - Battery Cabinet



Clamping System: Pivot Clamp and Upper Clamp



Battery Cabinet: Solar Regulator and 12 V Battery Pair



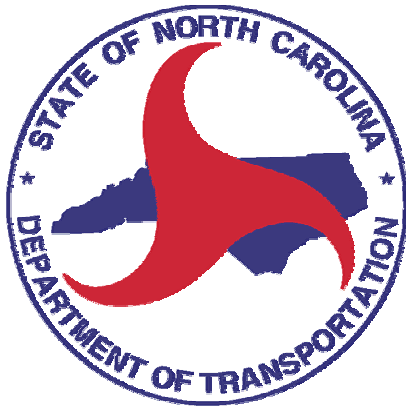
Equipment Pole: Radar Head and Solar Panel Mounts

RECOMMENDATIONS - *Summary*

- NCDOT needs a clear, visible POLICY on managing its traffic count program
- Determine best operating model
 - Multiple units vs consolidation of count collection
- Plan work in more coordinated fashion
- Scrutinize need of traffic count requests
- Build “forecasting” capabilities within key BU’s; hold them accountable for decision making
- Store counts in central location; make data accessible via web
- Best use of traffic related assets within 3 Tiers
- Hold Workshop on July 9th with key stakeholders
 - Report on Workshop results to TMT & LT in late July/early August

- **Host full day workshop on July 9**
 - Kickoff event to start communicating better and review preliminary recommendations
 - Invite: Collectors and Consumers
 - ◇ TSG, TESSB, ITS, Traffic Forecasting, HPMS, PMU, Operations and IT
 - ◇ FHWA national expert
- **AGENDA**
 - Meet and greet -- learn who does what and why
 - Review federal/state requirements
 - Program management issues
 - ◇ Budget, PEF contracts, critical path needs, workload and workflow, technology ideas, etc.
 - Develop Statewide Policy and concepts for addressing communication, workflow, project management, and asset management issues
 - Review Traffic Count Library and Central Database concepts
 - Brainstorm other improvement opportunities

Traffic Counts / Traffic Data Management



TMT Presentation
June 23, 2008

- Workgroup team
- Why Conduct this Workstream?
- Approach
- Hypothesis
- Facts and Findings
- Recommendations
- Next Steps

Workgroup Team

- Alpesh Patel – TMT Lead
- Meredith McDiarmid – Work Zone Traffic Control
- Will Beatty – FHWA
- Other Key Workstream contributors
 - Traffic Survey Group (Transportation Planning Branch)
 - Traffic Engineering and Safety Systems Branch
 - ITS Operations Unit
 - Division Traffic Engineers / Regional Traffic Engineers
 - Traffic Forecasting Units (Transportation Planning Branch)

Why Conduct this Workstream?

- Conducted Department-wide “Bottoms Up” evaluation – November 2007 to January 2008
- Findings categorized under 4 study areas (Feb. 2008):
 - “Deep Dive” Workstreams
 - Internal Efficiencies
 - Training Opportunities
 - Procedural Changes
- *Traffic Counts/Traffic Data Management* identified as 1 of 3 Deep Dive workstreams

Approach – March to June

- Stakeholder Interviews
 - Traffic Eng, Traffic Surveys, ITS, Work Zone Traffic, Forecasting Unit in TPB, GIS
- National best practice research
 - Iowa, Illinois, Georgia, Florida, New York, Wisconsin, South Carolina
- Survey to all 14 Divisions
- Field trips to Division 6 and 2 municipalities
- Quarterly roundtable with Regional and Division Traffic Engineers
- Resources referred to:
 - FHWA Traffic Monitoring Guide
 - Traffic Monitoring System (Dec 03)
 - AASHTO guidelines
 - Articles on Traffic Flow technology
 - Mike Bruff PMP paper (1999)

Hypothesis

- To identify a more strategic approach to managing traffic data and count collection services statewide. Analysis includes:
 - shared use and communication capabilities of equipment
 - use of technology to stream information in real time to internal and external customers. Storage and maintenance of data in a single database with mapping interface
 - improved collaboration of various BU's that either produce or need the data. consideration of a plan to govern long term decision making on the placement, use, collection & dissemination of traffic data

Hypothesis – Bottom Line

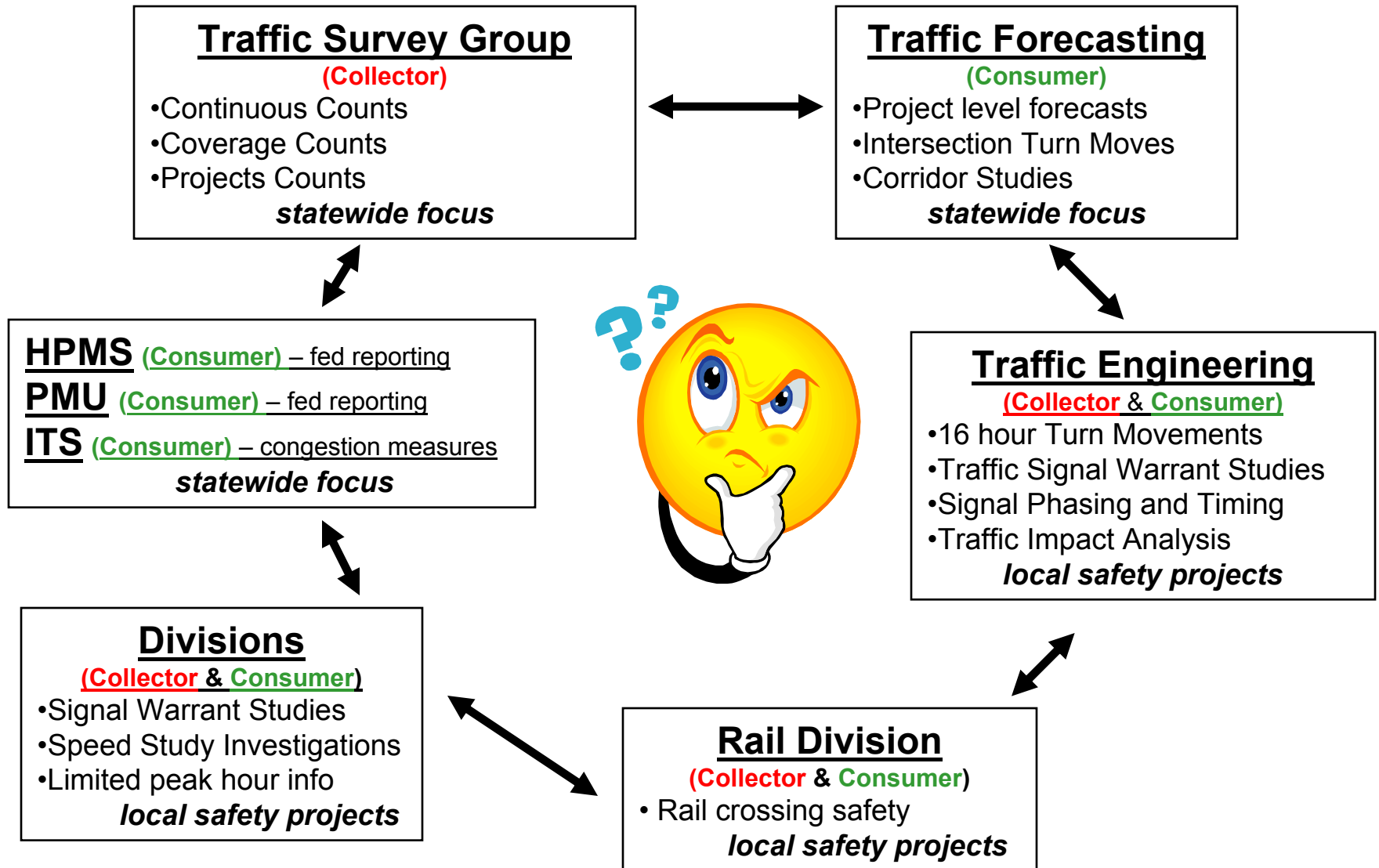
DELIVERY of PROJECTS

- What is the best way to **manage** a statewide traffic count program?
 - ◇ Project level forecasting
 - ◇ Critical path for TIP projects
 - ◇ Controlling factor in highway and pavement design decisions
 - ◇ Supports transportation planning and Air Quality conformity
 - ◇ Reporting data to Feds and Fed \$ in balance

MOBILITY CONDITION

- What is the best way to provide public **real time info** on mobility, congestion, travel times, etc?
 - ◇ Corridor mobility and congestion measures (local & statewide)
 - ◇ Detection devices vs. GPS/cell phone technology

Facts and Findings – Collectors vs Consumers



Facts and Findings – Common Themes

- **6-7 separate entities in NC that collect counts BUT**
 - 1) Data is stored “locally” and
 - 2) Counts are used for different purposes
 - ◇ Traffic Survey Group
 - ◇ Traffic Eng and Safety Systems
 - ◇ Developers/consultants
 - ◇ MPOs/RPOs
 - ◇ Municipalities
 - ◇ Rail Division (8000 crossings)
- **Unplanned Work / Delivery issues**
 - Duplication—2 different groups collecting counts in same location, one week apart
 - Traffic Forecasting has no forewarning of next forecast request
 - ◇ No pattern of seasonal work that can be managed and evened out
 - ◇ 8-10 weeks to turn around TM request; 5-10 months on project level forecast

Facts and Findings – Common Themes

- **More detectors vs using vehicles as “traffic probes” (GPS technology)**
- **Capture all count info (and history) in one map, and uploaded to one location**
 - Easy to find from DOT website
 - Search and sort capabilities
- **Shared resource and asset issues**
 - Purchasing traffic equipment in isolation
 - Use of equipment for both mobility measurement & project level work
 - Why not use PEF's to reduce workload burden?
 - Only 17 of 45 WIM stations in NC are operational

Facts and Findings – Common Themes

- **Visible Statewide standards and protocol**
 - Lack of clear role, responsibility, turnaround times, QA/QC
- **Is an organizational change req'd?**
 - Need for key BU's to be under a “Mobility Czar?”

Recommendations – Short Term

Formalize Roles & Responsibilities

- Develop Statewide Traffic Count Management POLICY
 - Identify Role, Responsibilities & Metrics of BUs that collect counts and why
 - Establish clear guidelines and standards on who, when, where, and how data should be collected and stored
 - Create a Decision Tree to help maximize resources
 - ◇ Traffic forecasters go to Divisions to collect counts vs TSG
 - Identify Customer Expectations
 - ◇ Quality of data
 - ◇ Turnaround times
 - ◇ Tie to individual BU metrics and/or create shared metrics?
 - Develop Service Priorities – what counts should be collected first and why?
 - ◇ Review Federal requirements and determine count priorities
- Proposed
1. Project level counts (TIP delivery)
 2. Coverage counts (fed requirement)
 3. Counts for AQ models (fed requirement)
 4. CTPs
 5. Turning Moves

Recommendations – Short Term

Formalize Roles & Responsibilities

- Develop Statewide Traffic Count Management POLICY
 - New rules/criteria to determine if that count is even necessary
 - ◇ Extraneous intersection counts on bridge forecasts
 - Create “forecasting” skills/capability within the BU’s requesting this service
 - ◇ Get around TPB “bottleneck” / spread workload
 - ◇ Increase accountability
 - ◇ Scrutinize the type of forecast coming
 - * Simple bridge forecast—use trend line analysis
 - * If it requires a model then go to TPB
 - ◇ Biggest requesters currently are:
 - * PDEA
 - * Feasibility Studies
 - * Divisions
 - * Consultants

Recommendations – Short Term

Plan Your Work...Together!

- Develop annual work schedules together in January
 - What locations will require counts (and what type)?
 - Determine how to use PEF's to balance workload and set milestones for timely delivery to customers
 - Start with supporting *Proof of Concept* projects in TIP Delivery workstream
- Review all contracts currently in place – use TESSB as model
 - Each Unit should look at their contracts to see if they could be used to help alleviate the burden of additional (read as unplanned) work
 - Could another Units' contract be used as a *template* to create a new contract
 - BU's should share requirements for prequalification
 - ◇ TESSB
 - ◇ Traffic Forecasting
 - ◇ TSG

Recommendations – Short Term

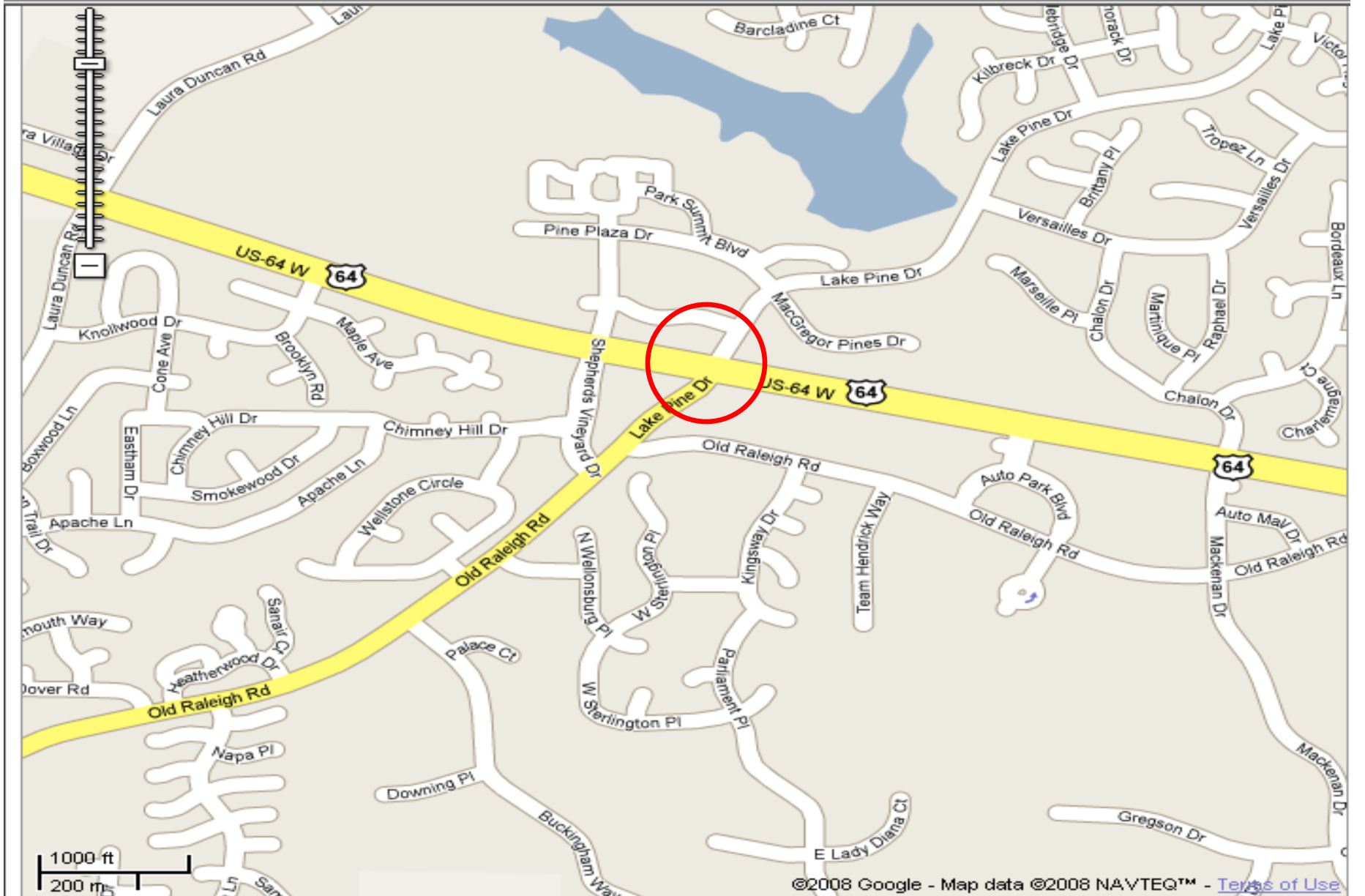
Develop Interim Traffic Count Library

- Use simple spreadsheet to start tracking count information
 - future posting to web & central database
 - Ascertain coordinate location of counts and/or devices
- Department standard for identifying data
 - Road segment, who requested it, associated with what TIP project
- Move all AADT GIS shapefiles into a Google map interface for EASE of viewing from the WEB
 - Otherwise you have to find the route, locate the county, find the right sheet and find the count
 - <http://www.ncdot.org/it/img/DataDistribution/TrafficSurveyMaps/default.html>
- Link with existing TESSB database

Who	What	Division	County	Where	Where	When	Why	Project	Map_It
Beatty, Will	16 hour, Turn Movement Count	5	Wake	US 64	Lake Pine Drive	16-Feb-08	TIP Alternative Analysis	U-2101	LINK
Patel, Alpesh	8 Hour Volume Count								LINK

<http://maps.google.com/maps?hl=en&q=US%2064%20and%20Lake%20Pine%20Drive%2C%20Cary%2C%20NC&um=1&ie=UTF-8&sa=N&tab=wl>

Who	What	Division	County	Where	Where	When	Why	Project	Map_It
Beatty, Will	16 hour, Turn Movement Count	5	Wake	US 64	Lake Pine Drive	16-Feb-08	TIP Alternative Analysis	U-2101	LINK



Recommendations – Long Term

Technology Issues

- Work with IT to migrate all HISTORICAL traffic count data into a CENTRAL location (**internal facing tool initially**)
 - Info Cube (storage) and Spatial Data Viewer (desktop access) concept
 - Consistent with Mark's Data Integration workstream
 - Easy to create forecasts and chart growth at particular locations
 - Search and sort capabilities
 - Develop security rights so consultants, public, developers can access
 - Use Doc Mngment/Collaboration workgroup to help GIS define user requirements for SDV (late summer)

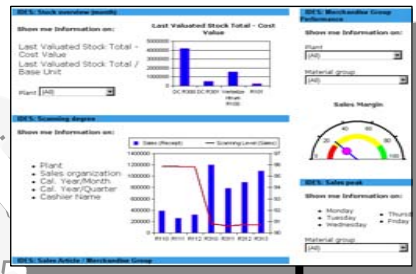
Recommendations – Long Term

Any and all traffic counts or equipment should be captured as a coordinate location (GPS encoder) --- this will allow for data to be mapped easily!

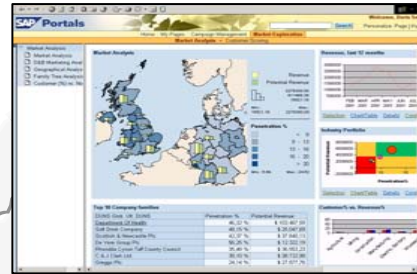
- Hardware in our system that should be migrated
 - ◇ ATR
 - ◇ WIMS
 - ◇ RTMS
 - ◇ Tube Counter
 - ◇ Manual count location
 - ◇ Signal system locations

The Future -- DOT Data Integration

Executive Analytics



GIS Map Integration



Business Content

"Info Cube"

Business Warehouse (BW)

Traffic Counts

Pavement Records

Finance & Projects

Bridge

3rd Party

Other?

SAP

Spatial Data Viewer (SDV) Concept Demonstration (6.11.08)

The screenshot shows the Exploring - NCDOT_Demo application interface. The main map displays a satellite view of a rural area with a road project highlighted in orange. A blue pushpin is placed on the map. A pop-up window titled "TIPRoads2007_2013.shp" displays the following information:

OBJECTID 8
Program U
TIPProjNr U-3420
TIPProjNr2 U3420
ROUTE_CITY ELIZABETH CITY
DESCRIP SR 1309 (MAIN STREET) EXTENSION, PROPOSED US 17 BYPASS TO US 17 BYPASS (HUGHES BOULEVARD). UPGRADE ROADWAY, SOME NEW LOCATION WITH INTERCHANGE AT THE PROPOSED US 17 BYPASS.
BRG1
BRG2
BRG3

The application window includes a menu bar (File, View, Tools, Help), a task center (Task Center - NCDOT XY to Mile...), a search bar, and a list of tasks (Find Place, Find Address, Identify, Create Notes, NCDOT Find TIP Number, NCDOT Query Task, Find Division Boundary, NCDOT Find Route, NCDOT XY to Milepost, ExcelTask). The status bar at the bottom shows the position (36°19'41"N 76°17'15"W, Altitude 5.37 Kilometers) and the ESRI logo.

Recommendations – Short Term

Equipment / Technology Issues

- Determine best use of any and all traffic related assets within 3 Tiers
 - fold under recommended Statewide Policy
- Pending federal legislation – out for national comment
- Statewide Tier
 - **Use Inrix on URBAN Interstates**
 - ◇ TCPP grant for I-95
 - ◇ Only 10% of Interstate system instrumented with Detection
 - ◇ GPS will be standard in vehicles by 2010
 - ◇ Where congestion info is most needed
 - **Use continuous counters (ATRs and WIMs) on RURAL Interstates**
 - ◇ Polled and processed nightly in SC
 - ◇ Hurricane evacuation use in FL
 - **Let Division signal techs (with training) manage WIM equipment instead of Kent**
 - ◇ Only 17 of 45 WIMs are operational
 - ◇ Follow FDOT TSG Example—get back to the basics!

Pending Federal Legislation for managing equipment

- Real-Time Information Program: Information Sharing Specifications and Data Exchange Format Reference Document
- Background
Section 1201 of SAFTEA-LU establishes the Real-Time System Management Information Program.
- The goals of this program are to improve security of the surface transportation system, address congestion problems, support improved response to weather events and surface transportation incidents, and facilitate national and regional highway traveler information.
 - The desired outcomes are to make Traffic and Travel Conditions Information available to the traveling public and to ease the sharing of Traffic and Travel Conditions Information among public agencies and private enterprise.
- See <http://www.ops.fhwa.dot.gov/publications/datexformat/index.htm>



Home | Accessibility | DOT Resources | Disclaimer | Contact Us | Site Map | Search Go!

Inside SCDOT | Getting Around in SC | Doing Business with SCDOT | Public Forum | Community Service

Getting Around in South Carolina

Quicklinks Go!

Travel Advisories

[Traffic Cameras](#)
[SC Road Conditions](#)
[Winter Road Conditions](#)
[Nationwide Conditions](#)
[SCDOT Incident Response](#)
[Motorcycles & Traffic Signals](#)
[Traffic Counts](#)
[State Line Bridges](#)
[Bridge Load Restrictions](#)
[Resurfacing Program](#)

Current SC Weather

[CNN.com](#)
[The Weather Channel](#)
[Weather Underground](#)
[Nat'l. Weather Service](#)
[Intellicast](#)

Traffic Information

[Traffic Cameras](#)
[Logo Sign Program](#)
[Motorcycles & Traffic Signals](#)
[Traffic Counts](#)

Emergency Response

[Emergency Response Procedures](#)
[SCDOT Incident Response](#)
[Coastal Evacuation Routes](#)

Highways or Dieways

[Official Site](#)

State Maps

[Map Information](#)
[Interstate & Welcome / Rest Areas](#)
[Map](#)
[Coastal Evacuation Routes](#)

Tourism



Traffic Polling and Analysis System

[Launch Traffic System](#)

System Description

The Traffic Polling and Analysis System provides traffic data and graphs from traffic counting devices on South Carolina's Highways. This system is intended for the general public to view current and historical traffic information during hurricane evacuation events.

Directions for use

Upon entering the system, click on the 'START' button at the bottom of the page to launch the application. A map will appear with blue and pink dots marking the locations of the Automatic Traffic Recorders (ATR). Select a location by clicking one of the dots. The darker blue dots represent data polled nightly. The lighter pink dots represent data polled hourly.

A counter data page will appear which shows hourly vehicle counts. Where available, the ATRs will also provide average speeds.

From the counter data page, you can access charts displaying historical averages vs. real-time counts by clicking on the chart graphic located just above the data

Related Topics



[Average Annual Daily Traffic](#)



[Coastal Evacuation Directions, Route Maps and Lane Reversal Plans](#)



[SCDOT Incident Response](#)

View Data - Microsoft Internet Explorer provided by NCDOT v.05.1b

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print Copy Paste

Address http://dbw.scdot.org/PollWebAppPublic/wfrm/wfrmViewDataNightly.aspx Go Links >>

Google G sc dot traffic data Go 1 blocked Check AutoLink AutoFill Send to sc dot traffic data Settings

SCDOT TRAFFIC POLLING & ANALYSIS SYSTEM

Version: 1.7.30.0

Help Exit View Site Locator Map

View to Graph

Atr 0068-1 0069 - 1 0070-1 Date 06/10/2008 GO

North South
SPEED LIMIT 60 SPEED LIMIT 60

Site: 0069-YORK for Tuesday, 06/10/2008
Site Location: I-77 Between US-21 & S-122

Time	Northbound			Southbound		
	Vehicle Count		Average Speed (MPH)	Vehicle Count		Average Speed (MPH)
	Current	Historical		Current	Historical	
01:00	369	343	71	445	420	61
02:00	301	225	73	247	253	61
03:00	339	226	74	235	219	62
04:00	337	288	73	270	240	62
05:00	411	440	67	393	312	60
06:00	1036	1024	68	583	540	59
07:00	2199	2126	70	937	1075	60
08:00	2585	2710	70	1485	1644	59
09:00	1839	1793	70	1335	1418	59
10:00	1456	1500	69	1391	1476	65
11:00	1431	1435	69	1280	1467	64
12:00	1481	1523	70	1352	1430	65
13:00	1548	1480	70	1335	1464	65
14:00	1643	1570	70	1234	1520	63
15:00	1759	1793	70	1413	1659	65
16:00	1697	1864	69	1824	1981	64
17:00	1629	1894	70	1948	2306	64
18:00	1710	1896	70	2147	2573	62
19:00	1415	1526	70	1832	1764	62
20:00	1044	1120	70	1206	1190	67
21:00	924	875	69	1003	955	66
22:00	721	726	68	890	887	65
23:00	658	648	68	644	620	65

Done Internet



Traffic Information

[Help](#)

Florida DOT Here

Can polling continuously




BUT

Choose to do this monthly instead of every day for cost effectiveness

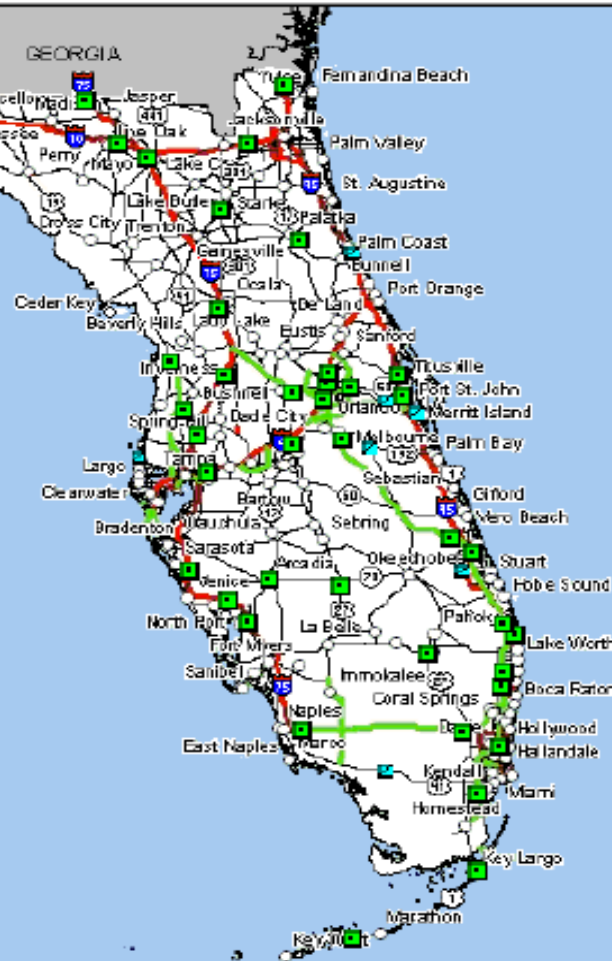
Primarily used for **special events and emergency and evac situations**

Central Time Zone Eastern Time Zone

Click traffic counter icons on the map

-  - Polling DISABLED; displays Historical Average
-  - Polling DAILY; displays Historical Average
-  - Polling HOURLY; displays Current Count VS. Historical Average

Note: Counters use the time zone in which they are located.



E-mail questions and comments to:
[Florida Department of Transportation's Help Desk](#)

<http://www3.dot.state.fl.us/trafficinformation/>

Recommendations – Short Term

Equipment / Technology Issues

- Determine best use of any and all traffic related assets within 3 Tiers
 - fold under recommended Statewide Policy
- Regional and Subregional Tiers
 - Purchase and deploy more portable radar technology in place of manual tube counters
 - ◇ Mast mounted system with radar head—can provide real time speed data
 - ◇ Reduces labor time and inaccuracies that occur when tubes are destroyed
 - ◇ Typically used for short term counts only
 - Study the use of traffic signals as counters on urban primary routes
 - ◇ NCDOT maintains approx 200 signal systems (7000 systems exist statewide)
 - ◇ Data storage and number of loops is current constraint
 - ◇ Detectors can be configured to send a second signal independent from the controller
 - ◇ Learn from municipalities, overcome constraints and merge data into DOT's central database/info cube

PNITDS

Portable Non-Intrusive Traffic Detection System



Mounts on the Back - Doesn't Interfere with Sign



Radar Head - Solar Panels - Pole System - Battery Cabinet



Clamping System: Pivot Clamp and Upper Clamp



Battery Cabinet: Solar Regulator and 12 V Battery Pair



Equipment Pole: Radar Head and Solar Panel Mounts

- NCDOT needs a clear, visible Policy on managing its traffic count program
- Plan work in more coordinated fashion
- Maximize use of PEF's
- Scrutinize need of traffic count requests
- Build “forecasting” capabilities within key BU's; hold them accountable for decision making
- Make count data more accessible via the web
- Hold Workshop in July
 - Come back to TMT and LT with Workshop results in late July/early August

- **Host full day workshop in July**

- Kickoff event to start communicating better and review Statewide Policy!
- Invite: Collectors and Consumers
 - ◇ TSG, TESSB, ITS, Traffic Forecasting, HPMS, PMU, Work Zone Safety, Ops representation and IT
 - ◇ FHWA National experts

- **AGENDA**

- Meet and greet -- learn who does what and why
- Review federal/state requirements
- Program management issues
 - ◇ Budget, PEF contracts, critical path needs, workload and workflow, technology ideas, etc.
- Review Statewide Policy and concepts for addressing communication, workflow, project management issues
- Review Traffic Count Library concept
- Brainstorm other improvement opportunities

Organizational Suggestion

Move key BUs under a new “Mobility Czar”

- TSG, ITS, and Regional ITS staff
- Is this not same as STOC?
 - Pros
 - ◇ Enforces communication, collaboration to happen quickly
 - ◇ Ensures greater success for developing and implementing new Statewide Policy (and strategic use of assets)
 - ◇ Will positively impact count turnaround times
 - ◇ Forces better utilization of PEF's and Divisions to collect counts that TSG can't currently get to
 - ◇ Greater accountability through shared metrics
 - Cons
 - ◇ Where in the organization?

Acronyms and Definitions

- WIM – Weigh In Motion
- ATR – Automated Traffic Recorders
- TESSB – Traffic Engineering & Safety Systems Branch
- TPB – Transportation Planning Branch
- TSG – Traffic Survey Group
- AADT – Annualized Average Daily Traffic
- TM – Turn Moves

Insert Graphic or Org chart showing relationships

Facts and Findings – Collectors vs Consumers

consumer = collect in house or by PEF

	<u>Work Zone</u>	<u>Forecasting</u>	<u>Traffic Eng and Safety</u>	<u>Traffic Services Group</u>	<u>HPMS</u>	<u>PMU</u>	<u>ITS</u>	<u>Divisions</u>
Collector		X	X	X				X
Consumer	X	X	X		X	X	X	X

who are they collecting for and why?

where is the count being collected?

what is the ultimate purpose of the count?

for which of these groups is the count info critical path?

how will the count info be disseminated or published?

which counts are a priority and what accuracy and qa/qc issues are req'd?

what standard (device used, how its stored, archive rules, duration) applies to a particular count?

Recommendations

Technology Issues

- Implement low cost/quick win methods for streaming traffic count/volume info to web (**external facing purposes**) start with WIMs and ATRs
 - **SCDOT and FDOT examples**
 - WINK in Cary
 - Will's Google map example???
 - **Show slide where Traffic Eng is currently posting TIAs to the WEB**
- ◇ <http://www.ncdot.org/doh/preconstruct/traffic/safety/TSI/>

Recommendations – Long Term

Technology Issues

- Leverage use of GPS, wireless, and cell technology by 3rd Party providers
 - ITS business case for Inrex vs. polling our permanent devices
 - TCPP Grant
 - Create a Pros/Cons list
 - Permanent devices need Stopwatch firmware & IT support
 - Capital and operating expense of tying these together and providing polling data to website
 - How many more ATRs and WIMs do we need to cover Interstates and US highways vs using vehicles as probes
 - GPS is standard in vehicles by Big 3 automakers in 2010
 - Devices
- Develop a Strategic Plan that outlines what is truly needed in urban vs rural areas
 - Thorough review of all devices we have (ATRs, WIMs, and RTZMs) to figure out best ROI and best use of equipment
 - what can be transmitted electronically vs buying new ones. Use Inrex to augment what we already have?
 - Maybe** -- Hybrid mix of 3rd party data providers (in vehicle GPS and cell phone) on rural interstates and strategically placed traffic sensors in urban areas)
 - Inrex cover urban interstates
 - ATRs and WIMs provide “real time” in rural areas

INREX articles and GPS technology

- What is Inrex?
- What are TMCs vs microwave roadside sensors?
- INSERT JoAnn's table here – regarding \$7 M vs. \$37 M
- Differentiate b/w capital vs operating costs too

INREX articles and GPS technology

- Insert picture/articles here
- Wisconsin DOT has seen good results



By Bob Laird, USA TODAY

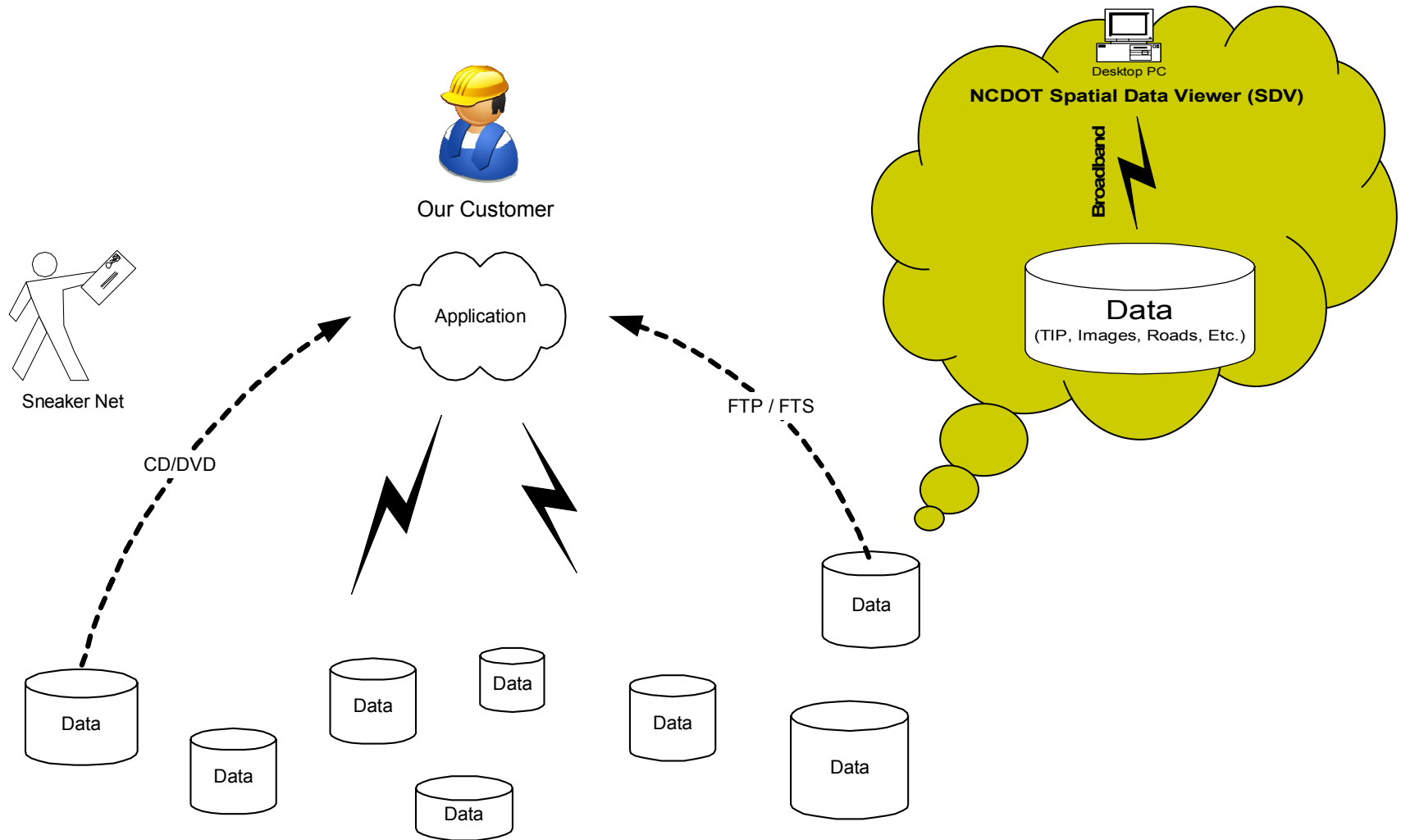
Quick Win Example – WINK in Cary

- Launched March 4 2008 (insert web link here)
 - users can view traffic information through four easy-to-read formats including: the traffic map, map tools, the navigation bar and the alerts window
 - With the traffic map, users can access traffic information at a glance on a map of Cary . To further customize their *wink* experience, users can choose from six map tools to instantly display icons representing incidents, construction, special events, cameras, flows and DMS (dynamic message signs)
 - The navigation bar on the left side of the map enables users to go to the map's default setting, view current construction projects, incidents and special events or find out what traffic impacts are coming soon. Lastly, the alerts window continuously displays timely traffic alerts at the top of the page to help on-the-go motorists better plan their travels
 - The cost to develop *wink web* is approximately **\$70,000** of the \$12 million total cost of the Advanced Traffic Management System

Short Term Recommendations – Technology Issues

- What is being posted to the Web TODAY?
- TEESB – link and explanation here
 - ◇ <http://www.ncdot.org/doh/preconstruct/traffic/safety/TSI/>
- TSG – link and explanation here
- Coordinated fashion to expedite this process and stream TM's and mainline volume info to the web
 - Next few slides are examples from:
 - ◇ SC DOT and or Georgia DOT
 - ◇ FL DOT
 - ◇ Zillow
 - ◇ Illinois DOT

Current Process



Facts and Quotes – State of Traffic Data

- SC DOT – Real Time Traffic Data
 - Embed link to map and counters

Facts and Quotes – State of Traffic Data

- <http://wink.townofcary.org/>
- Save this link so it can launch directly from power pt!!
- Go to this site and navigate to show what can be done!

Recommendations

- Check in and check out—similar to a card catalogue (interim step)
 - Department standard for identifying and storing traffic data
 - ◇ Road segment, who requested it, associated with TIP
- Work with IT to create a central database to store counts and map them
 - Ease of access for public, consultants, and internal staff
- PM issue -- Managing day to day services and meeting deadlines vs. contracting services out
- Communication and Collaboration
 - Get BU's together to discuss why they collect counts and what they use it for
 - Traffic Count Policy and Procedures and or a Central Steering Comm?
 - ◇ Justification for the count
 - ◇ Clear purpose and use
 - ◇ Standard for collecting and sharing info and who does what

Recommendation – Traffic Card Catalogue System

- Check in and check out—similar to a card catalogue, this is an interim step
 - Department standard for identifying data
 - ◇ Road segment, who requested it, associated with TIP

Recommendations – Communicate / Share Info

- Create a DOT policy that covers all count collection and dissemination
 - Make it web ready
 - Update it annual with any change
 - Put in under Office of Policy/Procedure
 - Clarify roles/responsibilities

Short Term Recommendations

A Picture is Worth a Thousand Words



- Traffic Forecasting
 - Does not know when next forecast is coming
 - Need more clarity on objective and use of the forecast
 - Miss the statistics book published by TSG
 - ◇ Adjusting for seasonal factors
 - ◇ Vehicle class information
 - ◇ Forecasting Truck ADT
 - Would like to get an electronic copy (Karen Rorberson pointed out that they had never asked for an electronic copy)
 - Share best practices internally
 - Technology: that takes people out of the equation
 - ◇ Anecdotal stories of human “Errors” doing counts

Information Gathering & To Do List

- What are the trends in traffic data management in the country?
- How is technology driving the various approaches DOTs are taking?
- Spend more on speed sensors or use vehicles with GPS as the “probes”?
- Set up more smart zones across the state?
 - Optimize routes and detours and more detours to minimize delays due to incidents
 - When speeds drop to a certain threshold DMS posts alt route traveler info in real time
 - Consider where to place permanent speed sensors so you can see what avg speeds are in real time
 - Get paper from Steve Kite on the smart zone set up on I-95
- What are the key resource needs—financial? Infrastructure? Or other?
- What are the Data needs? One stop shop for finding everything? Do we launch a separate data management workstream from this?

How Traffic Data is managed/shared currently

- ITS
 - Only 1% of real-time traffic data is currently reported
 - Lack of Interconnectivity
- Traffic Surveys
- Greg Fuller's group
- At the Division Level



Facts and Quotes – State of Traffic Data

- WSJ Article
 - Only 1% of real-time traffic data is currently reported



MINUTES OF TRAFFIC COUNT WORKSHOP #2

August 29, 2008

Bill Rosser started the meeting by commending the group for their efforts towards the Traffic Count Data collection process. He reminded those in attendance that the TMT is transitioning to other responsibilities. Bill has asked Kevin Lacy to be responsible for making sure this important effort continues. He encouraged everyone involved to share information and resources, use each other to produce results that have best interest of citizens of NC in mind. He also encouraged everyone to continue to work together and keep up the good work.

Meredith McDiarmid spoke on behalf of Kevin Lacy and thanked everyone for their efforts so far. She also told everyone that Kevin looks forward to working with everyone as we move forward.

Alpesh Patel moved the agenda forward by reminding everyone that this workshop was intended to provide the stakeholders with assigned deliverables from the last workshop to showcase their progress and give more detail. He asked each stakeholder to provide their information with their prospective by explaining these characteristics:

- Benefits
- Next steps towards implementation
- Timelines
- Owners
- Other key players
- Issues/barriers/challenges

Timelines were defined as:

<u>Immediate:</u>	By the next meeting
<u>Short term:</u>	3 months
<u>Mid term:</u>	3-6 months
<u>Long term:</u>	6-12 months

Alpesh also asked everyone to keep in mind the three “umbrella area” (groups) that were defined in the last workshop as we work together to provide access to data, advance the idea of central count suppository, and look at technology and equipment opportunities.

Jeff Roerden began facilitation of the meeting by reminding everyone that timelines are important and that stakeholders should identify relationships of their deliverables that affect the critical path towards project delivery.

PRESENTATION OF AUGUST DELIVERABLES

1. SPECIFICATIONS FOR TURNING MOVEMENT DATA COLLECTION – JEFF JAEGER

Issues Associated with Current Contract

- Information about the Traffic Engineering and Safety System Branch's (TESSB) traffic data collection program (including a sample turning movement collection contract and

guidelines) can be found on TESSB web site at
<http://www.ncdot.org/doh/preconstruct/traffic/safety/TSI/>

- The TESSB contract is focused on turning movements, but could be set up to collect additional data as well
- **80% of the data collected by TESSB is 16 hour turning movements. 20% is other data collected as needed.**
- **Everything is set up for a 1-2 week turn around after request which is the greatest benefit of this deliverable**
- There are contract limitations, but those can be mitigated, depending on the needs of the customer
- The contract can be revised to be more specific. However, standardization would be more desirable
- If the existing contracts don't meet the need they can be cancelled and re-initiated
- The contract is versatile with potential that has not been identified until more details are known. Once the needs are identified, the contract can be revised.
- TESSB has had good experience using firms for data collection
- Next step is to identify needs of the users so the specifications can be written accordingly
- Turning movement counts cost approximately \$1,000 per count (travel is a large part of that cost)
- Peak hour count costs depend on the need of the user
- Another barrier we face is not knowing exactly what the needs are. Currently, TESSB collects turning movement data Signals, Divisions, and Regional Traffic Engineers for things like traffic signals, citizen requests, etc.
- **Current turning movement data collection guidelines are for specific need, but there is the potential for so much more**
- One of the challenges is to find funding for the data collection. These contracts are funded under WBS elements.

Technology Issues

- TESSB is moving towards an electronic based system (getting rid of paper files, etc.). Firms submit everything electronically (picture, pdf, raw data)
- At least 3 years of data can be seen on the TESSB web site
- TESSB welcomes the emergence of a central repository and is ready to move our data as long as the format meets the need

CONCLUSIONS

- **TIMELINE: IMMEDIATE**
- Jeff advocated for:
 - ✓ Identification of other customers/needs of traffic data
 - ✓ Adjustments to existing contract to meet additional needs
 - ✓ Standards and specifications
- TESSB is willing to adjust existing contract and pre-qualification process to meet the needs of users

2. SPECIFICATIONS FOR COUNTS ON MAINLINE – KENT TAYLOR

- The specification was distributed but needs to be refined as it includes everything one might need from the Traffic Survey Group's prospective.
- **Any specification that is developed has to address the safety of the collectors**

- **Collection of this data is on the critical path**
- Kent advocated for a process similar to Jeff Jaeger:
 1. Identifying users and needs
 2. Build specifications and standards around those needs
 3. Enhance the draft Traffic Data Management Policy support items 1 & 2
- After needs are identified, a committee of collectors will be established for specification development. Collectors were identified as:
 - Kent Taylor (owner)
 - Jeff Jaeger
 - JoAnn Oerter
 - Mike Haley
 - Ric Cruz
 - TESSB will provide representative for signal data

CONCLUSIONS

- **TIMELINE: IMMEDIATE to SHORT TERM** once the needs of the users have been determined
- **ACTION ITEM:** Group to provide comments on draft model specification to Kent Taylor by September 11, 2008.

3. ROLES AND RESPONSIBILITIES OF DATA COLLECTORS AND USERS – MIKE BRUFF

- Mike provided a spreadsheet of Collectors and Users
- Data provided does not include:
 - Signal systems (Greg Fuller was identified as contact)
 - ITS Systems (JoAnn Oerter was identified as contact)
- Realize that Origin & Destination studies is a user need, but that information is not currently provided
- **Suggested surveying the Department to determine user needs.**
- **The largest known potential users are the cities and MPOs.**
- Internal baseline needs should be determined before we contact external users and collectors

CONCLUSIONS

- **TIMELINE: IMMEDIATE**
 - **ACTION ITEM:** Greg Fuller (Buddy or Milton please coordinate) and JoAnn Oerter will contact Mike Bruff with information about Signal Systems and ITS Systems respectively so it can be included in the spreadsheet by September 11, 2008
 - **ACTION ITEM:** Mike Bruff will update spreadsheet and redistribute to Traffic Count Data Team Members by September 12, 2008
 - **ACTION ITEM:** Alpesh Patel and Meredith McDiarmid will begin development of a survey to determine potential users and circulate to the group by September 12, 2008
-

4. SINGLE POINT OF CONTACT AND COLLECTION SPREADSHEET – ALPESH PATEL

- Showed a quick and simple tracking spreadsheet. The intention would be to link it to a Google interface map.
- Divisions could use this to post information to their web site so others could find what they collected and make use of the data
- Not practical for the Traffic Survey Group (TSG) because of the number of counts involved
- Mike Bruff wants to link it to our geospatial referencing system that would be a step towards implementation.
- GIS is looking at the HPMS for Kent's group that could be used as a template.
- **Alpesh explained the launch of a new spatial data viewer (SDV) committee made up of representation from Traffic Engineering, Operations, Planning, PDEA, Design, Asset Management and Operations).**
- **Group will study idea of using this spreadsheet as a template and build a set of user requirements to shape the SDV application**
- Internal participants could be the only challenges to implementation
- The SDV committee is the owner of this deliverable. Alpesh is chairing that committee.

CONCLUSIONS

- **TIMELINE: LONG TERM...conclude by spring 2009**
- SDV committee will be lead by Alpesh

5. STATEWIDE POLICY ON WHY WE COLLECT COUNTS – MIKE BRUFF

Dashboard Needs

- Ken Pace was identified as the TMT contact for the NCDOT dashboard that will be fed by traffic data to some degree.
- Mike knows crash rates and mobility traffic data will be necessary to support dashboard needs
- Other needs may include data for Access Management, Pavement Management/Design, etc. Are there others?

Federal Mandates

- Several federal mandates guide traffic data collection
- Known mandates include Pavement Management and HPMS
- Others may include the Rail Division. Are there others?

Engineering Processes

- Every traffic data collector would have a process that meets the needs of the user
- Traffic Forecasting and TESSB have processes.
- Should there be others?
- There may be more categories of processes that are discovered as we move along There is a current Research project evaluating how we calculate vehicle miles traveled (VMT). The result of this research may impact how we collect data
- **Proposed assembling a team of primary collectors of data (Traffic Data Management Team) to meet on a regular basis, coordinate activities, and provide leadership for process change and improved delivery of services (at a minimum representatives should include TESSB, IT, and TSG)**

CONCLUSIONS

- **TIMELINE: IMMEDIATE**
 - **ACTION ITEM:** Alpesh Patel will contact Ken Pace so Ken can get with Mike about potential dashboard needs.
 - **ACTION ITEM:** Group to provide comments on draft Traffic Data Management Policy to Kent Taylor/Dan Thomas by September 11, 2008.
 - **ACTION ITEM:** Mike Bruff will convene the Traffic Data Management Team
-

6. CHANGING AGREEMENTS WITH MUNICIPALITIES – BUDDY MURR

Current Agreements

- Shared a table of municipal contacts he was able to make
- Schedule “D” is the existing agreement with municipalities to maintain signal systems
- Current agreements do not pay for traffic count data collection
- Most municipalities would not mind collecting additional data if the schedules reflected the payment for that work
- Most municipalities collect data every 18 months to maintain the signal timing
- There are two aspects to municipal data collection; turning movements and mainline counts
- Municipalities are collecting various types and quality of data.
- Existing data would not include 16 hour counts
- Greg Fuller would have to be contacted to see if the schedule should/could be revised to get existing traffic count data if that were determined to be a need
- **This deliverable has an IMMEDIATE time frame for populating the table Buddy has started and broaching the issue of sharing existing data with Greg**

Communication with Municipalities

- **Municipalities that Buddy has spoken with agreed to share any existing data collected through signal systems that are maintained through these agreements**
- There are also data storage and warehousing issues
- Through conversations with the municipalities, Buddy got the impression that they have the capability but the counts they collect may only be good for a finite period of time
- The benefit of municipalities sharing existing data would be for one set of data to serve more than one purpose

Conclusions

- **TIMELINE: IMMEDIATE**
 - **ACTION ITEM:** Buddy Murr and/or Milton Dean will follow up with Greg Fuller about what, if anything will need to be amended to have the Municipalities share their existing traffic data with the NCDOT
 - **ACTION ITEM:** Buddy Murr to contact municipalities and complete population of table
 - Mike Bruff said TPB would have a high interest in receiving municipal turning movement counts to support traffic forecasts
-

7. TRAFFIC SURVEY DATABASE – KENT TAYLOR

- Showed an example of the existing turning movement traffic count database that has

- been capturing data since 1988
- **This database currently houses only TSG data**
- Another database contains turning movements received from TESSB
 - TSG has been receiving paper copies of data from TESSB since 1994
 - Kent crosschecks this TESSB database before collecting counts

CONCLUSIONS

- **TIMELINE: IMMEDIATE to SHORT TERM**
- IT is helping to make TSG's database more user-friendly by building in search capability

NEXT STEPS TO IMPLEMENTATION AFTER PRESENTATION OF AUGUST DELIVERABLES

- 1) Capture Complete User Needs, Customers and Requirements through a Survey
 - John Farley (GIS director) suggested using the Needs Assessment at this web site
http://www.fhwa.dot.gov/cadiv/segb/views/document/Sections/Section8/8_4_4.htm
- 2) Develop a Model for specifications and standards to support these needs, customers, and requirements
- 3) Enhance the Traffic Data Management Policy to capture all standards, specifications, and delivery methods. The Policy should also explain how counts should be collected, stored, reported and shared

VENDOR TECHNICAL PRESENTATIONS

There were two vendors of traffic data services present to illustrate their roles in the process

- IRD – Data collection products and services 2008
- Northrop Grumman – TPAS system

Additional Items

- The TMT is assembling a team to visit South Carolina to observe their Traffic Data Collection Program. Send an e-mail to Will Beatty if you are interested in attending.
- There will be additional communication through e-mail as we work to meet our deliverables.
- There are still outstanding deliverables from Workshop #1 (with mid and long term timeframes) with no owners. For the sake of time, these were not discussed but still need to be addressed in the future.

NCDOT Traffic Count Workshop # 2

August 29, 2008

Chief Engineer's Conference Room

8:30 am OPENING REMARKS – Bill Rosser

8:45 am DELIVERABLES

- Review & Follow Up – Workshop # 1
- Report Out – August Deliverables (8)
 - 10 minutes / owner (see next page for speaking order)
- Remaining Deliverables – Define timeframes (short, mid, long) and appropriate owners

10:30 am BREAK

10:45 am TECHNICAL PRESENTATIONS

- Equip / Data Storage / User Interface concept – Jerry Bagwell and IRD
- FLDOT Experience / TPAS software – Tony Giordano (Northrop Grumman)

11:30 am WRAP UP/SUMMARY

- Schedule Next Meeting?
- Discuss field trip to SCDOT
- New Spatial Data Viewer Committee

11:45 am ADJOURN

Example Standards, Specs, and Design Rationale	Turning Moves at Intersections Should counts be taken only at peak hour Define user needs Determine whether counts are necessary	Jeff Jaeger
	Counts on Mainline	Kent Taylor
Roles and Responsibilities	Who collects currently/what method do they use? What/Why should they collect? What are the expectations of the customer?	Group A plus Pavement Management (Debi Hutchings will collect comments and format product)
Single point of contact and collection spreadsheet	Who/What/Where/Contact Info	Alpesh Patel & Will Beatty
Purpose & Need Statement to accompany any traffic data collection request (req'd within 30 days of initiation)	Guidelines similar to current traffic forecasting requests Prerequisite for any other action including policy on standards and specs	Mike Bruff (or designee) -- Ric Cruz -- JoAnn Oerter -- Traffic Eng -- Hardee Cox
Statewide Policy on Why We Collect Counts	Review Federal Requirements Why count collection is important What counts are used for Roles and Responsibilities would eventually be folded under this deliverable?	Mike Bruff
Check on Changing Agreements with Municipalities	Data sharing issues with closed loop signal systems	Buddy Murr
Traffic Survey Database	provide access to other NCDOT units	Kent Taylor